СУЧАСНІ ПРОБЛЕМИ СЕЛЕКЦІЇ, РОЗВЕДЕННЯ ТА ГІГІЄНИ ТВАРИН

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SELECTIONBREEDING INDEX OF SOW REPRODUCTIVE QUALITY (BISRQ) AS – EFFECTIVE METHOD FOR ASSESSMENT AND SELECTING HIGH-PRODUCTIVE ANIMALS

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Abstract: *In the article the results of researches the sow reproductive qualities of Large White pigs taking into account their inbreeding differentiation according to the selection breeding index of sow reproductive qualities (BISRQ) are presented.It was established that sows of class M^+ exceeded significantly peers of the opposite class M^- in prolificacy by 3.4 heads, in milk yield by 18,3 kg, in weight of the nest at breaking at the age of 28-35 days by 19,7 kg.*

The maximum increase in additional products (13,01 %) was obtained from one sow of class M^+ and its cost is 320,57 hryvnias.The number of significant correlation coefficients between absolute and integrated indicators of reproductive qualities is 80,0 %; they are positive and vary from +0,331 to +0,986±0,0027. The correlation coefficient between the uniformity index of a sow's nest in live weight of piglets at birth (IUN) and the breeding index of sow reproductive quality (BISRQ) is +0,897±0,0185. The criterion for the selection of highly productive animals according to the breeding index of sow reproductive qualities (BISRQ) is an indicator of 96,22-118,92 points. The use of animals with the indicators of BISRQ provides additional products at the level of 13,01 %.

Key words: *sow, reproductive qualities, economic efficiency, integrated indicators.*

Introduction. In order to select and use intensively high-productive animals a number of methods are used. Among them an assessment by origin, lateral relatives, DNA markers, a comprehensive assessment and selection of animals according to the recommendations of the pig body conformation can be marked. Effective methods for assessing the breeding value of pigs is the assessment method by the BLUP index and some integrated indicators. [1-5].

The purpose of the work is to study the sow reproductive qualities of Large White pigs taking into account their inbreeding differentiation according to the breeding index of sow reproductive qualities (BISRQ) and determine the economic efficiency of their use.

Material and methods of research. Researches were carried out in the conditions of agricultural forms of Dnipropetrovsk region (PE «AF «Borysfen», LLC «Vozrozhdeniie») Breeding Laboratory State Establishment Institute of Grain Cultures of National Academy of Agricultural Sciences of Ukraine

according to research program of National Academy of Agricultural Sciences №30 «Innovative technologists of pedigree, industrial and organic production of pig breeding «Swine rearing».

Sows of Large White pigs were the object of research. Assessment of animals according to the main signs of reproductive qualities was carried out taking into account the following selection and genetic parameters: prolificacy, heads; size of foetus, kg; uniformity index of a sow's nest in live weight of piglets at birth, points; milk yield, kg; weight of the nest at breaking at the age of 28-35 days, kg; liveability, %. Uniformity index of a sow's nest in live weight of piglets at birth (1), as well as selection breeding index of sow reproductive qualities (BISRQ) (2), were determined by the following formulas:

$$ IB\Gamma = \frac{n}{2,5 - (\frac{x_{max} - x_{min}}{\overline{X}})} \qquad (1) $$

where: IBГ – uniformity index of a sow's nest in live weight of piglets at birth, points; n – prolificacy, heads; x_{max} – maximum live weight of the piglet in the nest, kg; x_{min} – minimum live weight of the piglet in the nest, kg; $\overline{X}$ – average live weight of the piglet in the nest at birth (size of foetus), kg *(Khalak, 2012)*;

$$ CIB\text{ЯC}=(6 \times X_1)+(9,34 \times (X_2 / X_3) \qquad (2) $$

where: CIBЯC – selection breeding index of sow reproductive qualities; X_1 – prolificacy, heads; X_2 – weight of the nest at breaking, kg; X_3 – age at breaking, days *(Tsereniuk, 2014)*. The economic efficiency of the research results (Methodology ..., 1983) and the biometric processing of the obtained data (Lakin, 1990) were calculated according to generally accepted methods.

Research results and discussion. An analysis of the data of primary zootechnical discounting and the results of the research indicate that sows of controlled herds are characterized by high reproductive qualities. Thus, the prolificacy of sows of the main herd is $11,2\pm0,12$ pigs per farrowing, size of foetus is $1,40\pm0,010$ kg, uniformity index of a sow's nest in live weight of piglets at birth is $5,30\pm0,068$ points, milk yield is $50,9\pm0,72$ kg, the weight of the nest at breaking at the age of 28-35 days is $73,5\pm0,75$ kg, the liveability is 90,7 %. The selection breeding index of sow reproductive qualities (BISRQ) of animals in the main herd ranges from 64,86 to 118,92 points.

The results of the reproductive qualities of Large White sows studies taking into account their inbreeding differentiation according to the breeding index of sow reproductive qualities (BISRQ) showed that animals of class M$^+$ compared with peers of class M$^-$ are characterized by higher rates of prolificacy (by 3,4 pigs or 26,35 %, td=13,82, P<0,001), milk yield (18,3 kg or 29,75 %, td=15,68, P<0,001), weight of the nest at breaking at the age of 28-35 days (at 19,7 kg or 23,31 %, td=16,75, P<0,001) (table).

The difference between animals of the indicated classes by the selection breeding index of sow reproductive qualities (BISRQ) is 26,77 points or 26,07 % (td=15,47, P<0,001).

In size of foetus and the uniformity index of a sow's nest in live weight of piglets at birth (IUN) the difference between animals of class M$^-$ and M$^+$ was 0,07 kg (td=2,18, P<0,05) and 1,74 points (td=11,08, P<0,001). The liveability index of piglets before breaking from sows in different classes ranged from 83,4 to 85,0 %.

The number of reliable correlation coefficients between the absolute and integrated indicators of reproductive qualities is 80,0 %; they are positive and vary from + $0,331\pm0,0842$ (sow milk yield × liveability of piglets at breaking, tr=3,93, P<0,001) to + $0,986\pm0,0027$ (sow milk yield × weight of the nest at breaking at the age of 28-35 days, tr=366,81, P<0,001). The correlation coefficient between uniformity index of a sow's nest in live weight of piglets at birth (IUN) and the selection breeding index of sow reproductive qualities (BISRQ) is positive and is to + $0.897\pm0,0185$ (tr=48,40, P<0,001).

The data and calculation analysis of the economic efficiency of the research results showed that the maximum increase in production (+13,01 %) was obtained in the class of animals where the selection breeding index of sow reproductive qualities (BISRQ) ranged from 96,22 to 118,92 points, and its cost is

+320,57 hryvnias (the selling price of 1 kg of young pig live weight at the date of the research was 44,70 UAH).

Indicators of sow reproductive qualities from different distribution classes according to the breeding index of sow reproductive qualities (BISRQ)

Indicator, unit of measure	Biometric indicator	Distribution class in breeding index of sow reproductive qualities (BISRQ)		
		M^+	M^0	M^-
	n	22	65	24
Prolificacy, heads	$\overline{X} \pm S\overline{x}$	12,9±0,21***	11,3±0,06	9,5±0,13
	$G \pm S_G$	1,01±0,152	0,53±0,046	0,65±0,093
	Cv±S_{Cv},%	7,82±1,179	4,69±0,411	6,84±0,988
Size of foetus, kg	$\overline{X} \pm S\overline{x}$	1,36±0,028	1,41±0,013	1,43±0,017
	$G \pm S_G$	0,13±0,019	0,10±0,008	0,08±0,011
	Cv±S_{Cv},%	9,55±1,440	7,09±0,621	5,99±0,807
Uniformity index of a sow's nest in live weight of piglets at birth, points	$\overline{X} \pm S\overline{x}$	6,16±0,133	5,35±0,051	4,42±0,084
	Cv±S_{Cv},%	10,15±1,530	7,83±0,686	9,37±1,339
Milk yield, kg	$\overline{X} \pm S\overline{x}$	61,5±1,04***	50,3±0,65	43,2±0,53
	$G \pm S_G$	4,91±0,740	5,30±0,464	2,61±0,377
	Cv±S_{Cv},%	7,98±1,203	10,53±0,923	6,04±0,872
Weight of the nest at breaking at the age of 28-35 days, kg	$\overline{X} \pm S\overline{x}$	84,5±1,04***	73,1±0,67	64,8±0,55
	$G \pm S_G$	5,81±0,876	5,44±0,477	2,72±0,393
	Cv±S_{Cv},%	6,87±1,036	7,44±0,652	4,19±0,605
Liveability, %	$\overline{X} \pm S\overline{x}$	85,0±1,14	83,4±0,67	84,4±1,17
Selection breeding index of sow reproductive qualities (BISRQ), point	**lim**	**96,22-118,92**	**81,17-95,72**	**64,86-80,57**
	$\overline{X} \pm S\overline{x}$	102,67±1,516***	89,40±0,493	75,90±0,834
	Cv±S_{Cv},%	6,93±1,045	4,45±0,390	5,39±0,778

*Note: *** - P<0,001*

Conclusion.

1. Indicators of reproductive qualities of Large White sows in controlled herds (prolificacy, heads; weight of the nest at breaking at the age of 28-35 days, kg) correspond to the minimum requirements of class I and class elite.

2. Taking into account the inbreeding differentiation by the selection breeding index of sow reproductive qualities (BISRQ) it was found that animals of class M^+ are superior to peers of class M^- in prolificacy by 26,35 (td=13,82, P<0,001), milk yield by 29,75 (td=15,68, P<0,001) and the weight of the nest at breaking at the age of 28-35 days by 22,31 % (td=16,75, P<0,001).

3. The correlation coefficient between the uniformity index of a sow's nest in live weight of piglets at birth (IUN) and the selection breeding index of sow reproductive qualities (BISRQ) is positive and is to + 0,897±0,0185 (tr=48,40, P<0,001). Their connection with absolute indicators of reproductive qualities is reliable and varies from +0,333 to +0,986 which indicates the effectiveness of their use in breeding.

4. The criterion for the selection of high-productive animals according to the selection breeding index of sow reproductive qualities (BISRQ) are indicators of 96,22-118,92 points. The use of animals with these BISRQ indicators provides additional products at the level of 13,01 %.

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СЕЛЕКЦІЙНИЙ ІНДЕКС ВІДТВОРЮВАЛЬНИХ ЯКОСТЕЙ СВИНОМАТКИ (СІВЯС) – ЕФЕКТИВНИЙ МЕТОД ВІДБОРУ ВИСОКОПРОДУКТИВНИХ ТВАРИН

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Анотація: В статті наведені результати досліджень відтворювальних якостей і економічної ефективності використання свиноматок великої білої породи з урахуванням їх внутрішньопородної диференціації по селекційному індексу відтворювальних якостей (СІВЯС). Встановлено, що свиноматки класу М$^+$ достовірно перевершували ровесниць протилежного класу М$^-$ по багатоплідності на 3,4 гол, молочності - 18,3 кг, масі гнізда при відлученні у віці 28-35 днів - 19,7 кг.

Максимальна надбавка додаткової продукції (13,01 %) отримана від однієї свиноматки класу М$^+$, а її вартість становить 320,57 гривень. Кількість достовірних коефіцієнтів кореляції між абсолютними і інтегрованими показниками відтворювальних якостей становить 80,0%, вони позитивні і змінюються в межах від +0,331 до + 0,986±0,0027. Коефіцієнт кореляції між індексом вирівняності гнізда свиноматки за живою масою поросят при народженні (ІВГ) і селекційним індексом відтворювальних якостей свиноматки (СІВЯС) дорівнює + 0,897± 0,0185. Критерієм відбору високопродуктивних тварин по селекційному індексу відтворювальних якостей свиноматки (СІВЯС) є показник 96,22-118,92 бала. Використання тварин з даними показниками індексу СІВЯС забезпечує отримання додаткової продукції на рівні 13,01%.

Ключові слова: свиноматка, відтворювальні якості, економічна ефективність, інтегровані показники.