

Efficiency of use of breeds of pigs of foreign and domestic selection for improvement of meat qualities

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The purpose. To study efficiency of combination of genotypes of domestic and foreign selection on reproductive and meat qualities of pigs, to reveal the most effective alternatives of combinations. **Methods.** Zootechnical, morphological, statistical, analytical. **Results.** The optimal alternative of combination of pigs of domestic and foreign selection during crossing mating is specified. Reproductive and meat qualities of pigs are probed at various alternatives of mating. **Conclusions.** Expediency of use of breeds Pietren and Krasnaya Belopoyasnaya at the final stage of mating for obtaining cross livestock with satisfactory feeding and meat qualities is proved.

Key words: 2-pedigree, 3-pedigree, crosses, genotypes, specialized meat breeds.

<https://doi.org/10.31073/agrovisnyk201805-13>

In most countries, pigs are the most important source of meat and fat. The direction of productivity modern breeds pigs depends on the requirements for the pork quality in the consumer market. In countries with highly developed pig production, the main focus of breeding is bacon pig breeding, which is characterized by high meat content in carcasses. In Europe, pigs of large white breed (British Large White) and the Landrace, Wales, and Pietrain breeds are used in different systems of crossing and hybridization in order to obtain young non-fat pork. The Americas, these purpose wolves have been widespread, such as Yorkshire, Hampshire and Duroc [1, 2, 3, 4].

Analysis of recent research and publications. Currently, the main requirement of the pork market is to reduce the amount of fat and increase the amount meat in the carcass.

Shannon R. [5] notes that the criterion for determining the category by the "SEUROP" system is the proportion of muscle tissue in the carcasses (the percentage of lean meat). According to this classification system, the category P includes carcasses containing 40% or less meat, categories O - 40-45%, R - 45-50%, N - 50-55%, and E - 55% and more. Beside this, an additional category S has been introduced, which provides for carcass content of more than 60% of meat. [6, 1].

Thus, in the world over the past thirty years, there has been a tendency to replace meat-and-fat and fattening pigs with meat-type animals, usually hybrids and pawns. The main breeding grounds were meat and speediness [6, 7].

Pork production in different countries of the world has its own peculiarities related to the systems maintenance and feeding. Countries like France, Ireland, Belgium, the United States mainly use bisexual interbreeding. In Holland addition to bivalent mixes, hybrids are produced on the basis industrial crossings four synthetic lines different breeds. In Ukraine it is more appropriate to use intergenital combinations using breeds of domestic breeding [7, 8, 9, 10].

Aim. Study the efficiency combination genotypes of domestic and foreign origin selection for reproductive and meat qualities of pigs to identify the most effective options combinations.

Materials and methods. We used the following methods: zootechnical; morphological; statistical; analytical.

Research results. When crossing the breeds Landrace of English origin (L) and the large white Ukrainian breeding (ULW-1) obtained the maximum value for multiplicity of 10.5-10.7 heads; with a fertility of 1.60-1.74 kg $P > 0.95$; milk yield – 66.9-70.9 kg at $P > 0.99$; the weight of piglets at the lunar age is 8.3-8.8

kg at $P>0.99$; weight of piglets at weaning in two months – 23.9-24.3 kg; Preservation – 87.9-91.4% at $P>0.99$ (Table 1).

1. Reproductive qualities of experimental sows in the first stage of research, ($M\pm m$)

Combine ♀ ♂	n	Multiplicity, heads	Incineration, kg	Milk production, kg	In 60 days:			Conser- vation, %
					number of pigs, heads	weight of the nest, kg	weight 1 head, kg	
ULW-1 ULW-1	12	10.5±0.67	1.51±0.052	64.6 ±1.10	9.4±0.24	222.4±0.47	23.7±0.30	89.5±2.25
L L	12	10.4±0.35	1.61±0.024	62.1 ±1.04	9.0±0.45	214.1±1.10	23.8±0.50	86.5±2.01
L ULW-1	12	10.7 ±0.39 ¹	1.74 ±0.570 ¹	66.9 ±0.85 ²	9.4±0.27	224.2±1.57 ³	23.9±0.47 ²	87.9±2.98 ²
ULW-1 L	12	10.5 ±0.39 ³	1.60 ±0.020 ¹	70.9 ±1.00 ²	9.6±0.27	233.5±1.28 ³	24.3±0.48	91.4±1.97 ²

Notes: P - in comparison with control (ULW-1 ULW-1): 1> 0.95; 2> 0.99; 3> 0,999.

According to the indices index the reproductive qualities of sows (IRQS) (Table 2), it was found that the crossing (♀ULW-1×♂L) received the highest value of 99.3 points, which is 2.3 points higher compared with pure breeding and at 0.2-3.6 points from the moths of other combinations.

2. Comprehensive evaluation of reproductive capacity of sows in the first stage of research, ($M\pm m$)

Indicator	Combine ♀ ♂			
	ULW-1 ULW-1	L L	L ULW-1	ULW-1 L
Estimated index, points	42.2±1.25	41.3±1.73	42.4±1.02 ³	43.0±1.36 ³
IRQS	97.6±3.48	95.7±2.28	99.1±3.06 ²	99.3±4.65 ²

Notes: P - in comparison with control (ULW-1 ULW-1): 1> 0.95; 2> 0.99; 3> 0,999.

The bases of different genotypes have certain differences in tension and growth energy. When weaning at 60 days' age, the best indicators live weight had a combination of animals (♀ULW-1×♂L) and (♀L×♂ULW-1). The live weight of piglets in experimental groups at the moment of weaning in two months was from 23.7±0.30 to 24.3±0.48 kg.

Triticuminal breads (Table 3) derived from the combination of the uterus (♀1/2ULW-1+1/2L) with bellies of red white belts (♂RWB) – 25.6 ± 0.13 kg $P>0.95$ and pietrain (♂P) – 26.2±0.12 kg $P>0.999$, for live weight, the control group's values were 1.9-2.5 kg, respectively.

3. Reproductive qualities of experimental sows, ($M\pm m$)

Boars breads	Multiplicity, heads	Incineration, kg	Milk production, kg	In 60 days:			Conser- vation, %
				number of pigs, heads	weight of the nest, kg	weight 1 head, kg	
Свиноматки генотипу 1/2УВБ-1+1/2Л (n = 36)							
DUSS	10.6±0.46	1.6±0.02 ¹	61.5±1.10	9.1±0.30	225.1±1.12	24.7±0.10 ¹	85.8±3.20
RWB	11.6±0.53 ²	1.3±0.03	66.9±1.08 ¹	9.6±0.32 ²	245.3±0.98 ³	25.6±0.13 ²	82.8±2.71
P	11.8±0.43 ²	1.6±0.02 ¹	69.3±1.04 ²	10.2±0.29 ²	267.1±0.72 ³	26.2±0.12 ³	86.4±2.47

Notes: P - in comparison with control (ULW-1 ULW-1): 1> 0.95; 2> 0.99; 3> 0,999.

The live weight of the sprats obtained from the horses (♂P) in 90 days exceeded 42 kg and was the highest, in comparison with other local analogues. The reproductive qualities of pigs derived from a combination of uterus (♀1/2ULW-1+1/2L) and diced Duroc Ukrainian selection "Stepnoy" (DUSS) were worse.

Animals have the best expressiveness of meat forms (1/4ULW-1+1/4L+1/2P), which is evidenced by the highest in these groups the importance of compactness indexes – 81.8-80.0% and massiveness – 147.4-145.3% (Table 4).

4. Indices of body structure of experimental animals, % (M±m)

Group	n	Index			
		Stretch marks	Compactness	Massiveness	Bones
At the age of four months (when feeding for fattening)					
1/4ULW-1+1/4L +1/2DUSS	20	178.6±0.12	69.1±0.14	123.4±0.12	29.3±0.15
1/4ULW-1+1/4L +1/2RWB	20	174.8±0.19	73.2±0.17 ¹	127.9±0.13 ²	28.9±0.18
1/4ULW-1+1/4L +1/2P	20	180.1±0.16	81.8±0.19 ³	147.4±0.16 ³	29.0±0.14
At the age of six months (when removing fattening)					
1/4ULW-1+1/4L +1/2DUSS	17	186.6±0.13 ²	69.6±0.16	129.9±0.13	26.5±0.17
1/4ULW-1+1/4L +1/2RWB	17	181.4±0.25	74.8±0.18 ²	135.8±0.19 ²	25.6±0.26
1/4ULW-1+1/4L +1/2P	17	181.5±0.17	80.0±0.35 ³	145.3±0.18 ³	25.5±0.17

Notes: P - in comparison with control (ULW-1 ULW-1): 1 > 0.95; 2 > 0.99; 3 > 0,999.

Animals with compact forms were obtained during the cultivation of three-breeds hybrids with the participation red white belt breed, the index of compactness – 73.2-74.8%, massiveness – 127.9-135.8%.

The three-breeding hybrids at the slaughter of 100 kg had a carcass length of 95.3±0.78 to 99.3±0.81 cm and the length of the bacon part from 78.9±0.84 to 81.4±0.26 cm (Table 5).

5. Characteristics of carcasses of experimental animals at slaughter of 100 kg, (M±m)

Indicators	Group		
	I	II	III
Number of heads	3	3	3
Carcase length, cm	99.3 ±0.81 ³	96.2 ±0.58 ¹	95.3 ±0.78
Length of bacon part, cm	81.4 ±0.26 ²	78.9 ±0.84	79.1 ±0.98 ¹
Mass of rear third of carcass, kg	12.3 ±0.19 ²	12.8 ±0.13 ²	13.5 ±0.16 ³
Area of "muscle cell", cm ²	45.3 ±0.63 ²	56.7 ±0.96 ³	63.4 ±1.51 ³
Shear thickness, mm	24.4 ±0.24	21.8 ±0.11	16.1 ±0.16 ³

Notes: I - 1/4ULW-1+1/4L+1/2DUSS; II - 1/4ULW-1+1/4L+1/2RWB; III - 1/4ULW-1+1/4L+1/2P; P - in comparison with control (ULW-1 ULW-1): 1 > 0.95; 2 > 0.99; 3 > 0,999

The largest area of the "muscle cell" was in the ranges obtained from the combination (♀1/2ULW-1+1/2L×♂P) – 63.4±1.51 cm² P>0.999, which is quite natural and due to the influence of the type and the breed of boars.

Conclusions

At the first stage of hybridization, it is recommended to cross the moths of the Ukrainian large white breed of intrauterine maternal type (UWB-1) with breeds of Landrace English breeding, which will allow them to get a maternal form with a strong constitution and good reproductive qualities. The expediency of using the pietrain and red white belts during the final cross-breeding stage has been proved to produce a livestock with satisfactory fattening and meat qualities.

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