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USAGE OF THE PIG BREEDS OF GERMAN ORIGIN IN COMMERCIAL PIG BREEDING OF UKRAINE

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Modern pig-breeding is based on intensive using of general knowledge of selection procedures with involving in the process all breeds from the whole world as well as the modern technologies **[1]**. Ukraine is not an exception and also imports pigs of different genotypes from different countries to breed them on its territory according to the special selection programs **[2,10]**.

In connection with this there are opposite views concerning effectiveness of using imported animals in Ukraine **[6,8]**. From one hand there are famous examples of such crossing for improving performance and fattening traits of progenies **[9]**, from the other hand there are some negative examples concerning decreasing the meat quality **[12]**.

The pig breeds of German origin are not presented in the breeding programs of Ukraine at the moment, therefore the aim of this study was to analyse the effect of usage of the most common German breeds in Ukrainian commercial pig breeding.

Material and Methods

Experiments were realized in the commercial farm “Orzhytska” of central Ukraine. This farm belongs to the famous regional pig-production farms. The sows of Ukrainian Large White (ULW) breed were artificially inseminated with semen of boars of 3 German breeds: German Large White (GLW), German Landrace (DL) and Pietrain (Pi) from AI-centre Neustadt a.d .Aisch/Bayern (Germany). In such way 4 research groups were produced (Table 1).

Once the animals have reached the live weight of 100 kg, the backfat thickness evaluation in 3 points was made: a) over 6/7 thoracic vertebra, b) 6 cm to the right from the middle of the back between sacrums and withers, c) 6 cm to the right form the middle of the back and 15 cm towards to sacrum from point b **[3,5,7]**. After slaughter the evaluation of meat traits and

meat quality according to general accepted methods was made. The results were statistically calculated using the program Statistics 6,0.

Results and Discussion

One of the most important performance traits is backfat thickness of pigs at the age of 100 kg. In our research the crossbred animals, especially with the terminal sire breed Pietrain, had thinner backfat in comparison with pure breed animal in all points, where measuring were conducted (Table 2). The difference between pure breed animals and their analogies from the 4^{th} group at the level of 6/7 thoracic vertebra was 10,1 mm ($P<0,05$) and at the level of loin was 7,7 mm ($P<0,05$). These results confirm analogical tendency that was obtained in previous researches **[4]**.

The cutting of right half of carcass from 4 typical pigs in each group was done after slaughtering and the results are presented in Table 3. As it can be seen, the hybrids had the higher lean meat cuts and lower fat cuts comparing with pure breed animals. Hybrids, obtained by crossing ULW with DL and Pi produced more meat in half-carcass than the pure breed pigs up to 3 till 5% respectively. At the same time the fat cuts from half-carcass by the hybrids from 3^{rd} and 4^{th} groups was correspondingly up to 5 and 7% lower. Progeny obtained from crossing ULW with GLW have shown intermediate results.

In general, the results obtained coincide with the results presented by other scientists concerning effectiveness of usage of commercial breeds for improving the performance and meat traits of final hybrids, especially with terminal sire line **[11]**.

To determine the effect of factor of genotype on traits backfat thickness and average daily gain the general variance analysis was done. It was proven that the factor of genotype had a high significant effect on the backfat thickness (p-level=0.0003). At the same time nearly a significant influence was detected regarding average daily gain (p-level=0,065).

The important criterion of this study was the meat quality analysis of crossbred animals. The meat samples were estimated after 48 hours post mortem. The obtained results are presented in Table 4. No considerable difference between groups was determined for the traits pH-level and water holding capacity. From the other hand the meat of the progeny from 4^{th} group may differ from those of group 1 for such meat quality traits like tenderness – 0.6 sek., colour – 13 extension units x 1000 and losses by thermal processing – 1.5%. It has to be mentioned that intramuscular fat contents in the MLD of hybrid pigs from group 3 and 4 was significantly lower than group 1 (0.52% and 0.65% respectively). Exactly these differences were the reason to organize the organoleptic evaluation of the meat, the results of what are presented in Table 5.

It can be seen from the Table that the men and women estimated the meat differently. The men prefer meat from pure breed ULW animals and those, obtained from crossing ULW with DL. That meat samples were estimated with 4.23 and 4.27 points correspondingly, according to Ukrainian taste panel. The women during the same test evaluate the meat samples of ULWxPi with the highest score – 4.72 points. In general, the women gave the higher points for all samples comparing with men.

By the evaluation of bouillon the assessment results of women and men were similar. All of them preferred the bouillon obtained from meat samples of pure breed ULW pigs – 4.33 and 4.25 points correspondingly. These results in fact mean that the intramuscular fat content influences the taste of bouillon to a greater extend than the taste of the meat.

Summary

Large White Breed of Ukrainian origin (selection) can be good used like mother breed for crossing it with the different breeds of German origin. The hybrids obtained have considerable thinner backfat in all different points of body. This fact will play an important role during the transfer from Ukrainian to EU carcass grading system.

The use of pigs of German origin influenced the meat quality of crossing progeny. Especially the changes were registered concerning intramuscular fat deposition, which was by Pietrain crossbreds lower. This influenced the taste of both meat and bouillon and was noted by men and women as well.

Assumed all facts it can be concluded that usage of pigs of German origin in Ukrainian pig production in general can be considered very positive.

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List of Tables

Table 1: Scheme of forming of research groups

Group number	♀	♂	Sows number
1	ULW	ULW	10
2	ULW	GLW	10
3	ULW	DL	10
4	ULW	Pi	10

Table 2: Backfat thickness of experimental pigs measured alive in different points (M±se)

Group number	Backfat thickness, mm			
	6/7 thoracic vertebra	Middle of the back	Loin area	In average
1	35,45±0,40[a]	27,88±0,41[a]	25,07±0,34[a]	29,12±0,32[a]
2	26,38±0,70[c]	22,50±0,58[b]	20,10±0,46[c]	22,64±0,46[c]
3	30,09±0,97[b]	22,52±0,45[b]	21,47±0,36[b]	24,18±0,39[b]
4	25,39±0,46[c]	19,26±0,32[c]	17,35±0,35[d]	19,73±0,32[d]

- means with different letters differ significant (P<0,05)

Table 3: Results of cutting of experimental pigs (M±se), n=16

Group number	Meat cuts from half-carcass, kg	Meat cuts from half-carcass, %	Fat cuts from half-carcass, kg	Fat cuts from half-carcass, %
1	18,85±0,71	59,6±0,02	8,98±0,71	28,3±0,02
2	17,81±0,28[b]	58,8±0,03	8,25±1,45	26,8±0,04
3	19,92±0,44[a]	62,8±0,01	7,51±0,33	23,7±0,01
4	19,64±0,87	64,5±0,03	6,59±0,81	21,7±0,03

- means with different letters differ significant (P<0,05)

Table 4: Meat samples assessment results after 48 hours post mortem. (M), n=16

Group number	Tenderness, sek.	pH-level	Colour, extension units x 1000	Water holding capacity, %	Losses by thermal processing, %	Intramuscular fat, %
1	5,2	5,5	76	55,59	23,0	2,79
2	5,3	5,4	83	54,03	24,5	2,92
3	5,1	5,4	77	54,07	21,3	2,27
4	4,7	5,5	63	55,45	24,5	2,14

Table 5: Organoleptic assessment of meat quality of different genotypes. (M), n=16

Traits	Evaluation made by women Group number				Evaluation made by men Group number			
	1	2	3	4	1	2	3	4
Average score of meat	***4,23***	***4,02***	***4,27***	***4,13***	***4,35***	***4,45***	***4,17***	***4,72***
Average score of bouillon	***4,33***	***4,23***	***4,15***	***4,03***	***4,25***	***4,30***	***4,20***	***4,15***