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MORPHOLOGICAL AND BIOCHEMICAL PARAMETERS OF BLOOD AND QUALITY OF MEAT OBTAINED FROM PIGS WITH DIFFERENT STRESS RESISTANCE

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Summary. The results of the experiments were used to evaluate the morphological and protein composition of blood, as well as the quality of meat from pigs of different stress resistance. The studies were carried out under the conditions of PJSC 'Stepovyi' in Zaporizhzhia Region on Large White (LW) pigs and Large White/Charcoal Landrace (LWCL) crossbreeds. During the study period, the hygienic conditions of keeping, feeding and watering of the animals, their growth and development, clinical condition and morbidity were evaluated. After reaching a live weight of 100 kg, the pork meat quality (pH, moisture content, oxyproline, tryptophan) of slaughtered animals was studied. It was found that the LW genotypes were superior to the local LWCL by the number of leukocytes in passively resistant (PR) animals — by 2.7%, in stress resistant (SR) animals — by 3.15%, and in stress sensitive (SS) animals they were inferior by this indicator by 7.7%. There was no significant difference in erythrocyte content between SR and SS, but erythrocyte content was 8.53% lower in PR. The concentration of hemoglobin was higher in PR animals of the Large White cross. The latter were superior to LW in terms of total protein: PR — by 2.26%, SR — by 1.9%, in terms of albumin — PR had an advantage of 16.6%, SR — by 7.69% ($p < 0.05$). Gamma globulin content was 6.44% lower in SS animals. They were superior to LW in terms of live weight: PR — by 14% at one month of age; by 4.2% at four months of age, SR — by 6.2%, but the difference between SR and SS was not significant. PR animals of the Large White breed were superior in terms of hemoglobin content. The level of total protein in blood serum was higher in crossbred genotypes: in PR — by 2.26%, in SR — by 1.9%. The concentration of albumin was higher in the crossbred animals than in the LW: PR — by 16.6%, SR — by 7.69%, and the level of gamma globulins was 6.51% lower in the SS. In terms of live weight, crossbred genotypes outperformed LW: passive resistant genotypes — by 14% at one month of age, stress resistant genotypes — by 6.2% and 4.2% at four months of age. The crossbred genotypes reached 100 kg live weight: PR — at 180 days, SR — at 183 days, SS — at 191 days, which is 4, 5, and 12 days earlier than LW, respectively. In crossbred pigs, the positive correlation for thoracic girth was 0.6942 and 0.8310, and for withers height — 0.6643 and 0.6811. In terms of body length, animals of the crossbred genotype were superior to LW: PR by 4.2%, SR by 1.46%, while the difference in chest girth and body length in SS individuals was not significant. Lung weight was 0.84% higher in PR and 3.7% higher in SR, and kidney weight was 9.8% higher in PR, 6.56% higher in SR, and 1.37% lower in SS. LW animals were superior in heart weight. Behavioral responses (fighting, skirmishing) were more pronounced in the crossed genotypes, especially in SR and SS animals. A higher level of tryptophan was found in the meat of SR crossbred animals, oxyproline — in PR and SR, pH of meat — in Large White PR and SR ranged from 5.61 to 5.72 units, in crossbred animals this indicator did not exceed the values of 5.03–5.21 units. Defects in meat with PSE (pale, soft, exudative) signs of LW were found: in PR — 0.4%, SR — 0.63%, SS — 3.7%, and in LWCL respectively — 2.3%, SR — 2.1%, SS — 4.21%, in local — defects in meat with DFD (dark, firm, dry) signs were manifested in 3.1%, 2.15%, and 5.1%

Keywords: meat defects, PSE, DFD

Introduction. One of the main objectives of the pig industry is to protect and increase the resistance and productive potential of pigs to stressful influences, while also obtaining high-quality meat that is environmentally friendly in terms of sanitation (Cherniy et al., 2018; Chorniy et al., 2017; Kramarenko et al., 2019). Non-contagious diseases can limit pig production. These diseases can be caused by various factors, including non-compliance with the microclimate (which accounts for 60–80% of cases (Shchepetilnikov et al., 2019)), violation of feeding and watering regimens (Voronyak, Leskiv and Huberuk, 2018), early separation (Lukashchuk, Slivinska and Shcherbatyy, 2018), crowding and regrouping (Poroshinskaet al., 2020), non-compliance with the technological principle of 'all empty–all occupied' (Cherny et al., 2019), and inadequate feeding (Cherniy et al., 2018). There is limited research on 'factor infections' or 'high-tech pathologies', despite their significant impact on the intensive development of pig production. Breeding for lean meat in pig production has resulted in issues such as tail gnawing, limb and reproductive organ diseases, and pork with PSE and DFD defects (De Oliveira et al., 2018; Lucy and Safranski, 2017). According to research, biologically active additives do not yield positive results in pig farms with unsatisfactory microclimates and inadequate breeding and selection practices (Cherniy et al., 2018, 2021). Therefore, in modern conditions, veterinary specialists and technologists should focus on disease prevention rather than treatment (Tucker et al., 2021).

In the past two decades, there has been significant research on the use of domestic and foreign pig breeds with high fertility and growth intensity (Chernenko et al., 2022; Khalak, Gutyj and Bordun, 2022).

However, some authors (Cherniy et al., 2018; Kozyr et al., 2019; Milostiviy, Karlova and Sanzhara, 2017) have reported that only 50–60% of the genetic productive capacity is realized due to inadequate housing conditions and non-compliance with breeding technologies. The analysis of contemporary data indicates that animal health, productivity, and product quality are influenced by environmental conditions by 60–80%, and by internal genetic factors by 20–40%.

The issue of high productivity in pigs with good meat quality is currently relevant. Breeding efforts have been focused on producing meat-type pigs with lower fat content in the carcass. Various genotypes of imported pigs, including Landrace, Duroc, Pietren, and Yorkshire, have been introduced to Ukraine in recent years. However, these breeds are highly sensitive to adverse environmental conditions and may struggle to adapt to new natural and climatic conditions (Khalak and Gutyj, 2020).

In intensive pig production, biosecurity and animal safety are crucial due to the need to maintain a sanitary regime and increase overall organism resistance. Natural factors of the biosphere such as air quality, feeding and watering regimes, and solar radiation play a significant role. Many experts argue that prevention is more effective than fighting diseases, as 80–90% of diseases are non-infectious. Only 10% of diseases are infectious. The production and rearing of piglets is the most critical stage in pig farming because they are highly sensitive to changes in room temperature (Lykhach et al., 2022; Zhyzhka, Povod and Mylostyvyi, 2019).

Imported pig breeds do not fully meet the requirements of practitioners due to low productivity and resistance. This is evidenced by early culling of sows, gastrointestinal and respiratory diseases in young animals, low resistance to temperature and humidity changes, high concentrations of harmful gases, and sensitivity to stress. Stress-sensitive animals can produce pale, soft, exudative meat in case of PSE defects and dark, dense, dry meat in case of DFD.

The **aim of the study** was to investigate the growth and development of animals, the characteristics of metabolic processes and to evaluate the quality of pork obtained from Large White (LW) and Large White/Charcoal Landrace (LWCL) animals with different resistance to stress. The evaluation of pork quality from genotypes with varying resistance is necessary due to limited research on changes in blood serum protein composition and morphological parameters in passively resistant (PR), stress-resistant (SR), and stress-sensitive (SS) animals.

Materials and methods. The experiments were conducted at PJSC 'Stepovyi' in Zaporizhzhia Region. The study involved 30-day-old LW and crossbred piglets (LWCL). To assess the stress sensitivity of piglets, we used the 'dorsal' test proposed by Hessing et al. (1993). This test involves placing the piglets in a dorsal position for one minute and recording their behavioral response. The animals selected were subsequently tested using the 'turpentine test' for resistance, according to the method of Kuznetsov and Sunagattulin (1991). The test involved injecting purified turpentine in a dose of 0.1 cm^3 intradermally from the inside of the ear, which caused a localized inflammatory reaction (erythema) of various sizes (26–32 mm) in the animals.

Aggressive animals (fighting, scuffling, anxiety, attempts to escape and biting) when kept in a dorsal position and with an erythema size of at least 32 mm at the site of turpentine injection were assessed as stress-sensitive (SS), calm animals, without piercing squealing and with an erythema size not exceeding 26 mm were assessed as passively resistant (PR), and animals with an attempt to escape without squealing and red spots on the abdomen and erythema sizes not exceeding 30 mm were defined as stress-resistant (SR). Taking into account the behavior and reaction to turpentine administration, the animals were divided into three groups according to stress sensitivity (Table 1). In particular, the number of PR animals among the LW genotypes was 23.06% ($p < 0.05$) higher than in the crossbreds, there was no significant difference in SR, and in SS they were inferior to LW by 23.61% ($p < 0.05$).

Table 1 — Distribution of pigs of different genotypes by resistance to stress

Genotype	Number of animals			
	Total	PR	SR	SS
LW	196	121 (61.73%)	51 (26.02%)	24 (12.24%)
LWCL	212	82 (38.67%)	54 (25.47%)	76 (35.85%)

The animals were then housed in stalls of 15–20 animals in a space of 0.9–1.3 m^2/ind. Hygienic conditions during the experiment (October 2019–November 2020) varied: air temperature — 16–18 °C, humidity — 72–78%, air movement speed — 0.2–0.3 m/s, illumination — 42–68 lux, air contamination with microflora — 95–120×10^3 CFU/m^3.

During the experiment, we monitored the clinical condition, growth, and development of the animals. We also examined their blood for morphological and biochemical parameters and recorded any instances of animal morbidity. After reaching a body weight of 100 kg (at 180th–195th days of age), we studied the meat qualities of the slaughtered pigs.

To evaluate the health and metabolic processes of pigs, we utilized several methods: counting the number of leukocytes and red blood cells in the Goryaev chamber according to Vasilieva, hemoglobin concentration — by the hemoglobin-cyanide method, protein composition of raw blood — according to Chumachenko (1990), activity of aspartate aminotransferase (AST) and alanine aminotransferase (ALT) enzymes according to Kondrakhin et al. (2004).

To investigate the quality of pork meat, we collected average samples from the muscular part of the carcass (*m. longissimus dorsi*) weighing 200 g. We then measured the active acidity (pH) using a millivoltmeter pH-125, determined the moisture retention capacity using the press method by Grau and Gamm in the modification of Volovynska and Kelman, and measured the oxyproline content using the Neumann-Logan method in the modification of Verbitsky and Deterej. Tryptophan content was determined by the Spies and Chambers method modified by Heller (Kovalenko, Gil'man and Orlova, 1987); microclimatic parameters (air temperature was measured by TKA-PKM/20, humidity by August's static psychometer), skin and ovary surface temperature by Nimbus-420 pyrometer (Antonenko et al., 2018).

Results and discussion. During the experiment, the growth and development of pigs were studied: height at the withers, width and girth of the chest (Table 2). These indicators characterize not only the development of individuals but also the size of their internal organs (Lykhach et al., 2020).

Table 2 — Measurements of pigs of different resistance

Resistance to stress	Genotype	Characteristics		
		Body length, cm	Chest girth, cm	Height at the withers, cm
PR	LW	147.3±10.9	98.2±1.2	68.2±0.7
	LWCL	158.4±0.73	102.4±1.18	69.8±0.63
	% to LW	107.38	104.27	102.36
SR	LW	143.4±0.86	96.1±0.8	66.2±0.7
	LWCL	154.8±0.71	98.1±0.67	67.4±0.52
	% to LW	107.98	102.15	101.76
SS	LW	148.5±0.51	97.6±0.54	67.2±0.38
	LWCL	156.3±0.41	98.4±0.66	68.1±0.42
	% to LW	106.88	100.84	101.35

High live weight at 6 months of age was characterized for LWCL pigs, they had a positive correlation in chest girth (0.6942 and 0.8310), height at the withers (0.6643 and 0.6811), respectively, with age, these differences persist. In terms of body length, animals of the LWCL genotype were superior to LW: PR — by 4.2% ($p < 0.05$), SR — by 1.46 ($p < 0.05$). The crossbred animals were superior to LW in body length: PR — by 7.38 %, chest girth by 4.27 %, height at the withers — by 2.36 %; SR were inferior to PR in these indicators, but superior to SS in body length by 7.98 %, chest girth and height at the withers, but the difference was not significant.

Growth and development of pigs. Live body weight (Table 3) is an integral indicator that characterizes the health of pigs (Chernenko et al, 2022; Khalak and Gutyj, 2020).

Table 3 — Dynamics of live weight of pigs with different stress resistance (M ± m, n = 5)

Age, days	Genotype	Live weight, kg		
		PR	SR	SS
25–30	LW	5.61±0.12	5.57±0.17	5.84±0.11
	LWCL	6.40±0.16	5.84±0.30	5.70±0.09
	% to LW	114.2	104.8	97.6
120–125	LW	42.70±2.07	43.10±0.96	40.30±1.70
	LWCL	44.50±8.10	45.80±1.24	38.10±1.20
	% to LW	104.2	106.2	94.7
180–185	LW	71.30±2.4	72.10±1.68	73.90±3.21
	LWCL	73.60±1.85	72.40±1.43	74.40±2.30
	% to LW	103.35	100.4	100.66
210–215	LW	88.40±1.52	91.40±0.51	94.20±2.60
	LWCL	92.10±1.60	93.60±0.38	96.80±1.40
	% to LW	104.1	100.2	102.7

A study on pigs (LW and LWCL) with different resistance levels showed that crossbreds grew more intensively. At four months of age, PR exceeded LW by 4.2% in live weight, SR by 6.2%, and SS lagged behind in growth by 5.3% (Table 3). This pattern persisted in the future. From six months of age, there was no difference in live weight between mixed SR and SS animals compared to LW. PR animals of the Great White grew less intensively than LWCL offspring. At six months of age, their weight was 72.1 ± 1.68, which is 2.95% less ($p < 0.05$).

It is worth noting that the mixed animals reached a weight of 100 kg: PR in 176 days, SR in 180 days, SS in 191 days, and LW in 180, 190, and 203 days, respectively.

These measurements characterize not only the morphological and functional state of the organism, but also the development of internal organs. According to our research results, the breast index (61.8 %) was the highest in PR and SR animals, both purebreds and crossbreds, and the lowest (58.6 %) in SS, which confirms the results of previous studies (Poroshinska et al., 2020; Shchepetilnikov et al., 2019).

An indicator that characterizes the quality of meat is the area of the 'muscle eye' (ME), the thickness of the fat over the 6th–7th thoracic vertebrae and the lumbar region.

The area of the ME in LWCL — SR and PR pigs was 31.8 and 32.4 cm^2, and SS — 29.7 cm^2, in crossbreds — 32.8–36.5 ± 0.6 cm^2 and regardless of resistance, they exceeded purebreds by 3.1–12.6%. These results are consistent with the data of other scientists (Lykhach et al., 2020). It is considered the norm that this indicator is: in PR and SR of the Great White — 32.8 ± 0.36 cm^2 and 39.0 ± 0.5 cm^2 in LWCL — 36.5 ± 0.6 cm^2.

Between animals with different resistance, there was no significant dependence on the development of internal organs (Table 4).

Table 4 — Indicators of internal organs weight in pigs of different resistance at slaughter when reaching a weight of 100 kg

Parameter	Genotype	Group		
		PR	SR	SS
Lung weight, g	LW	714.30±3.62	718.00±3.70	704.10±4.10
	LWCL	720.10±2.43	710.10±3.01	730.60±5.20
	% to LW	100.8	98.8	103.7
Heart weight, g	LW	385.10±7.3	345.40±6.80	341.20±7.40
	LWCL	347.00±2.10	338.50±3.11	336.10±1.90
	% to LW	90.1	98.0	98.5
Kidney weight, g	LW	142.20±4.10	152.30±5.20	158.60±3.70
	LWCL	156.00±1.70	162.30±2.20	150.50±2.40
	% to LW	109.8	106.56	98.67
Weight of the thyroid gland, g	LW	6.01±0.07	5.94±0.07	5.91±0.06
	LWCL	5.89±0.06	6.02±0.09	6.12±0.04
	% to LW	98.0	101.3	103.5

The analysis of the data indicates that there was no significant difference in the development of internal organs between the Large White and Large White/Charcoal Landrace (LWCL). However, in PR crosses, the lung weight was 0.84% higher, and in SS, it was 3.7% higher. The kidney weight was 9.8% higher in PR and 6.56% in SR ($p < 0.05$), while in SS, it was 1.37% less. Crossbred animals had a higher weight of the thyroid gland. In the study, heart weight was found to be higher in LW animal — PR by 9.9% ($p < 0.05$), SR — by 2% and SS — by 1.5%.

Hematological parameters in pigs. Blood is a reflection of physiological processes (Table 5) occurring in the body, and its indicators are indicators of their health (Kozyr et al., 2019).

Thus, the PR animals of the Great White breed outnumbered LWCL by leukocytes — by 2.75%, SR animals — by 3.15%, and SS animals were 7.7% inferior to LW ($p < 0.05$). There was no significant difference in the number of erythrocytes in SS and SR, but their content was 6.27 and 6.75% less, especially in PR — by 8.53% ($p < 0.05$), in SS and SR the hemoglobin concentration was higher by 5.7% ($p < 0.05$) and 1.3%, and PR pigs were 3.8% behind LW in this indicator ($p < 0.05$). Thus, in terms of red blood cells and leukocytes, the interbreeding animals were inferior to LW, and in terms of hemoglobin concentration they were superior to them ($p > 0.5$).

Table 5 — Changes in morphological parameters of blood of pigs with different resistance (M ± m, n = 5)

Parameter	Genotype	Group		
		PR	SR	SS
Leukocytes, g/l	LW	8.48±0.25	8.27±0.14	8.15±0.22
	LWCL	8.29±0.30	8.01±0.27	7.50±0.31
	% to LW	97.75	96.85	92.3
Erythrocytes, T/l	LW	6.23±0.11	6.78±0.09	7.04±0.16
	LWCL	5.84±0.20	6.32±0.18	6.44±0.16
	% to LW	91.47	93.21	93.73
Hemoglobin, g/l	LW	103.00±2.16	98.70±0.31	95.70±0.21
	LWCL	99.10±1.80	100.20±0.52	101.20±0.25
	% to LW	96.2	101.1	105.7

The state of health of pigs and the intensity of metabolic processes in their body were evaluated by biochemical parameters of blood (Table 6) and the level of aminotransferases.

Table 6 — Protein composition of blood serum of pigs with different stress resistance (M ± m, n = 5)

Parameter	Genotype	Group		
		PR	SR	SS
Total protein, g/l	LW	79.40±1.85	76.20±1.90	79.30±2.12
	LWCL	81.20±2.10	77.65±2.50	79.51±2.07
	% to LW	102.26	101.90	100.26
Albumins, %	LW	42.70±1.70	40.30±7.85	42.41±1.52
	LWCL	43.80±1.20	43.40±1.70	43.16±1.50
	% to LW	116.66	107.69	101.76
Globulins, %	LW	57.30±1.70	59.70±1.52	57.51±1.12
	LWCL	56.20±2.30	56.40±1.17	57.90±1.17
	% to LW	98.25	94.4	100.52
γ-Globulins, %	LW	12.60±0.52	12.87±0.31	13.06±0.41
	LWCL	12.33±0.43	12.38±0.37	12.21±0.36
	% to LW	97.85	79.19	93.41

The level of total protein is a crucial homeostasis constant that characterizes metabolic processes involving protein. According to the data analysis in Table 6, the amount of total protein in LWCL animals is higher than in LW: PR by 2.26%, SR by 1.9%, and SS by 0.26%. However, the overall amount of total protein falls within the normal range, and in the crossbreds, it is higher. Regarding albumin content, crossbred animals maintained an advantage: in PR — by 16.6%, SR — by 7.69% ($p < 0.05$), SS — by 1.76%.

The level of gamma globulins, which act as carriers of immune protection, was higher in LW — PR by 2.15% and 3.81% ($p < 0.05$). Therefore, PR and SR animals were superior to LW in terms of total protein and albumin content, but inferior in terms of gamma globulins due to lower productivity, as confirmed by a high survival rate of 92.1%.

Aminotransferases are important in cellular metabolism as they participate in reactions of transamination and are at the junction of the pathways of nitrogen, carbohydrate, and fat metabolism. They also regulate the glycolysis-glycogenolysis system. The highest activity of aminotransferases was found in LWCL pigs. The level of AST in PR and SS crossbred animals was in the range of 0.74–0.76 mmol/l, which is 9.31% and 11.25% higher ($p < 0.05$) than in LW analogues. ALT level, regardless of genotypes, was 0.31–0.33 mmol/l.

Physical characteristics of pork. The study evaluated physical parameters in meat samples (*m. longissimus dorsi*) and the results are presented in Table 7.

Table 7 — Indicators of moisture, fat and protein in meat of pigs with different resistance (M ± m, n = 3)

Parameter	Genotype	Group		
		PR	SR	SS
Moisture retention capacity, %	LW	64.00±0.30	63.62±0.20	62.73±0.20
	LWCL	55.30±2.40	58.40±1.35	46.90±1.20
	% to LW	86.4	91.7	74.8
Protein mass fraction, %	LW	20.86±0.13	21.10±0.12	20.02±0.10
	LWCL	20.74±0.38	20.63±1.20	20.37±0.60
	% to LW	94.4	97.7	101.7
Intramuscular fat,%	LW	4.79±0.09	4.56±0.11	4.17±0.27
	LWCL	3.86±0.30	4.13±0.36	3.94±0.20
	% to LW	80.5	90.57	94.4
Ash, %	LW	1.18±0.20	1.21±0.40	1.08±0.01
	LWCL	1.02±0.20	1.14±0.40	0.82±0.01
	% to LW	92.70	95.02	75.9

Among the carcasses of LW pigs, passively resistant pigs had the highest moisture retention capacity, while the lowest was observed in SS. In LWCL-SS animals this indicator did not exceed 46.9 ± 1.2%. In terms of protein content, they were inferior to purebred PR and SR by 5.6% and 2.3%, respectively ($p < 0.05$). The presence of fat tissue gives pork a high caloric content and makes it tender, juicy, and flavorful. In the LW group, its content was found to be 19.5%, 9.43%, and 5.6% higher ($p < 0.05$).

By the diameter of muscle fibers (29.71 ± 0.03 μm), raw meat from LW was inferior to the passive resistant and stress resistant by 13.6% and 18.4%, and the marbling pork (fatty interfascicular layer), on the contrary, was superior to the crossbreeds. Thus, according to the standard, marbling in PR was 32%, in LW its index was within the limits: SR — 31.02%, SS — 29.6%, which is lower, respectively, than in crossbreds ($p < 0.05$).

For consumers, the ratio of amino acids in meat is just as important as their content. This is especially true for nonessential amino acids, such as oxyproline, which can make pork tougher and less easily digested by the human body (Table 8).

Table 8 — Amino acid composition of pork meat with different resistance (M ± m, n = 3)

Parameter	Genotype	Group		
		PR	SR	SS
Tryptophan, mg %	LW	3.15±0.01	3.20±0.01	2.76±0.02
	LWCL	2.70±0.01	2.79±0.01	2.53±0.01
	% to LW	85.71	97.18	91.66
Oxyproline, mg %	LW	0.54±0.01	0.51±0.01	0.51±0.01
	LWCL	0.51±0.02	0.55±0.01	0.52±0.01
	% to LW	94.41	92.72	99.07
Protein quality index (PQI)	LW	5.83	5.81	4.86
	LWCL	5.29	5.47	5.41
	% to LW	90.70	94.10	89.83
pH, units	LW	5.61	5.72	5.12
	LWCL	5.39	5.21	
	% to LW	96.90	96.90	98.20

The concentration of ions in meat (pH) depends on the amount of lactic acid formed from glycogen 24 hours after slaughter. According to the pH level, the indicator in PR animals was in the range: 5.39–5.61 units, in SR — 5.21–5.72 units, in SS — 5.03–5.12 units. In general, this indicator in LW pigs (PR and SR) was higher (5.61–5.72 units), which indicates the good quality of the products obtained and the intensity of the maturation process, which increases the resistance of meat to microflora and a long shelf life. A higher level of tryptophan was in LW meat — 3.2 ± 0.01 ml%, oxyproline — in PR and SR.

Defects in meat with PSE: LW passively resistant animals had a defect rate of 0.4%, while SR had a rate of 0.63% and SS had a rate of 3.7%. For DFD, the defect rates were 1.3%, 2.5%, and 5.1% for PR, SR, and SS, respectively. In crossbreed LWCL with PSE abnormalities were found in 2.3%, 2.1%, and 4.2% for PR, SR, and SS, respectively. For DFD defect the rates were 3.1%, 2.15%, and 5.4%, respectively, which is consistent with the results of other researchers (Lykhach et al., 2022).

The ethological features of pigs with different resistance levels have not been thoroughly studied, including their time for feed eating, lying down, and leadership in the group. Our findings indicate that PR individuals exhibit calm behavior and spend an average of 18–20 minutes more time eating feed than crossbreeds, especially SS. Studies have shown that during 12 hours of daily time, the number of conflicts among LW is significantly lower for passively resistant (5–6 times) and SR (15–18 times) compared to SS (58–61 times). The number of conflicts in crossbreed LWCL was: PR — 11–13, SR — 21–33, SS — 121–154.

Conclusions. In the conditions of intensive pig breeding, along with selection for productivity, animals should be evaluated to identify individuals for resistance to abio- and biological factors. Testing by the 'turpentine test' revealed in the LW genotype: passive-resistant (PR) — 61.73%, stress-resistant (SR) — 26.02%, stress-sensitive (SS) — 12.25%; in the LWCL genotype, respectively — 38.57%, 25.35%, and 36.07%. Evaluation of pigs by interior indicators makes it possible, firstly, to assess their health, and secondly, to predict how much quality raw meat can be obtained from them. Pork from LW with a pH value of 5.61–5.72 units, tryptophan content of 3.15–3.20 mg%, oxyproline 0.51–0.53 mg%, moisture content 62–64%, and from LWCL, respectively, 5.21–5.03 units, 2.70–2.79 mg%, 0.54–0.55 mg%, 55–58 mg% should be considered as high-quality in terms of sanitation and technology and be classified as high grade.

Breeding pigs only for productivity (average daily gain of at least 550 g, reaching a live weight of 100 kg in 165–185 days) and obtaining lean meat has led to increased sensitivity of animals to the PSS (porcine stress syndrome), and the meat from such carcasses is called PSE (pale, soft, exudative) or DFD (dark, firm, dry). The desire of farmers to shorten the fattening period (6–6.5 months) is not always justified, as animals accelerate weight gain due to sarcoplasmic and sarcolemma proteins, and muscle and adipose tissue do not have time to reach physiological maturity.

Prospects for further research. The issue of determining the level of resistance of pigs of different breeds, both domestic and imported, to abio- and biotic factors requires additional comprehensive study. This will ensure the production of technologically high quality and safe meat.

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