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LINEAR MEASUREMENTS OF CARCASES OF THE MYRHOROD BREED PIGS

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Objective. *To evaluate the dependence of carcass characteristics of pigs of the Myrhorod breed on the starting capabilities of animals in the neonatal period of development.* ***Methods.*** *Three groups of pigs were formed, differing among themselves in the number of piglets in the litter at birth. For the purpose of comparative assessment, indexes for three groups as a whole were also determined. Young boars were selected for fattening and further slaughter. All piglets were received in one period, had free access to feed in accordance with the needs of sex and age groups. This stage of research was conducted at the experimental base of Institute of Pig Breeding and AIP NAAS. The main measurements of pig carcasses were taken at the meat processing plant of "Prodfoodservice" LLC in Poltava. Animals with a live weight of 100 kg were selected for the assessment. General rules were followed for the assessment of pig carcasses. The topography of fat deposition on the carcass was determined by the following points of taking measurements of the thickness of lard with skin: at the withers; at the level of 6 – 7 thoracic vertebrae; on the waist; on the crosses in three points; at chest level. The formula proposed by N. V. Pivniak was used to determine the average thickness of lard along the spine (watering of the carcass). To compare animals of different groups of pigs of the Myrhorod breed, the full meatiness index (FMI) was calculated. The research results were processed using the traditional method of variational statistics.* ***Results.*** *The differences between the different groups were insignificant in relation to the girth of the sternum. According to the latitudinal parameters of the bacon half of the carcass, there were also no significant differences between different groups of pigs, with a slight shift of preference towards the third group. Regarding the ratio of the front to the back parts of the bacon halves, the smallest values were found in the animals of the second group, and the largest in the first group. Regarding the determination of fat thickness at different points of taking measurements, a clear picture regarding the superiority of a*

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certain group was not determined, although according to most indexes, the carcasses of animals of the first group were marked by larger actual measurements. The animals of all three groups did not meet the requirements for the first extra and the second category of pigs for slaughter according to the fat thickness index at the level of 6 – 7 thoracic vertebrae. All evaluated carcasses were assigned to the third category, which corresponds to the type of productivity of Myrhorod breed of pigs. According to the comprehensive assessment of carcass watering, the highest values were obtained for the first group, the average values for the second group, and the smallest values for the third group, respectively. The opposite picture was observed for the full meatiness index, although differences in this index were also unlikely. By comparing the main and most important indexes of the linear diameters of the carcasses of three different groups with the same indexes for all evaluated animals, the animals of the third group were the closest to the average values in relation to the front to the back parts of the bacon halves, the thickness of the lard at the level of the 6 – 7th thoracic vertebrae. At the same time, the animals of the second group were the closest to the average values according to the full meatiness index. ***Conclusions****. As a result of the conducted research, it was found that there is no dependence of meatiness indexes, quality characteristics of pig carcasses, and in particular, their salinity, etc. from the starting capabilities of animals in the neonatal period of development. Non-compliance with the requirements for the first extra and second categories of pigs for slaughter was found, which indicates that the productivity of the new generation of animals of the Myrhorod breed still belongs to animals of universal and fatty genotypes, although the carcasses according to the lard thickness index are at the level of 6 – 7 thoracic vertebrae were at the lower limit of the third category of pigs for slaughter.*

Keywords: *pigs, Myrhorod breed, slaughter qualities, pig carcasses, lard, meatiness, watering of carcasses.*

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Introduction. Modern pig breeding is a high-tech sub-industry of animal husbandry, where the considerable attention is paid to the overall efficiency of production [1–3]. Further progress of the industry is achieved due to the combination of selection and breeding work and the use of the manifestation of the effect of heterosis during commercial production. Modern commercial breeds of pigs are selected for a high level of productivity according to the main economic and useful characteristics, however, along with this, pigs of modern meat breeds are distinguished by a fast metabolism, and, therefore, higher requirements for the completeness of nutrition, especially protein, which depends on optimal ratio between replaceable and non-replaceable amino acids [4–6]. In addition to the higher level of needs for adequate nutrition, there are a number of other factors that must be taken into account when using such breeds of pigs. Among them, the conditions of housing and resistance to a number of diseases are also critically important.

The further development of pig breeding as an industry clearly requires a scientific approach with the determination of directions for the optimization of pork production technologies, taking into account various potential problems [7–9]. For certain technologies of pork production, there is a need to involve those breeds that are adapted to various conditions of feeding and housing and are resistant to a number of diseases. The use of such breeds in crossbreeding and hybridization systems will allow to increase the efficiency of these pork production technologies due to the use and manifestation of the effect of heterosis. Therefore, small breeds of pigs are also of great interest.

The preservation of the unique gene pool of pigs of domestic breeds is an important task. One of the ways to preserve the Myrhorod breed is to use the latest selection methods in purebred breeding to increase its productivity and attractiveness for the production of high-quality marketable pork and to use it as a maternal base in hybridization schemes. Pigs of the Myrhorod breed are well adapted to the use of pastures, have a strong constitution and digest fiber better compared to breeds of the meat production direction [10, 11]. At the same time, in connection with the outbreak of African plague, the world's only herd of pigs of the Myrhorod breed was liquidated in August 2018. Thanks to the work carried out by the employees of Institute of Pig Breeding and AIP NAAS and specialists of the SE "DG im."Dekabrystiv", a search for pigs of the Myrhorod breed was conducted in subsidiary farms and their breeding was organized. As of January 1, 2020, it was possible to increase the herd by 1.7 times [12]. From the beginning of 2023, the "Program for the restoration of the Myrhorod breed of pigs in Ukraine for 2023-2025" was approved, according to which work on the restoration of the breed was expanded with the SE "DG im. Decabrystiv" at the experimental base of Institute of Pig Breeding and AIP NAAS [13]. This program provides for constant monitoring of meat and fat characteristics in representatives of the breed, which also includes an assessment of the quality of pig carcasses. At the same time, it should be taken into account that the work on the restoration of the breed is carried out on a limited number of pigs, where all factors that can affect the realization of the genetic potential of pigs and, accordingly, the accuracy and fidelity of selection and breeding work should be taken into account. In this aspect, an important point is the starting capabilities of piglets in the neonatal period, which is emphasized by a number of scientists [14–16]. In addition to the fact that sows differ among themselves in terms of milk yield, there is also a significant difference in the amount of milk that piglets receive during the suckling period, depending on the size of the litters. Accordingly, having different starting opportunities in an extremely important period of life, piglets can realize their genetic potential in different ways. Although the meat traits of pigs belong to traits with a high degree of inheritance [17–19], the influence of factors that can restrain the growth and development of young animals and, accordingly, be reflected in the final productivity of pigs, should not be rejected. Therefore, the assessment of the presence or absence of the dependence of meatness indexes, quality characteristics of pig carcasses, in particular their salinity, etc., on the starting capabilities of animals in the neonatal period of development is an urgent issue of scientific interest, especially for selection within small pig populations. **The purpose of research.** To evaluate the dependence of carcass characteristics of pigs of the Myrhorod breed on the starting capabilities of animals in the neonatal period of development. **Research materials and methods.** In order to determine the presence or absence of the dependence of the carcass characteristics of Myrhorod pigs on the starting capabilities of the animals in the neonatal period, three groups of pigs were formed that differed in the number of piglets in the litter at birth. The 1st group (control) young animals were selected from low-fertility litters, which were characteristic of the

Myrhorod breed of pigs at the previous stage of its development (8 or less piglets), the 2nd group (experimental) young animals were selected from medium-fertile litters – the bulk of modern sows stage of the breed's development (9 – 11 piglets), the III-rd group (experimental) young were selected from multi-fertile litters – promising sows (breeding core of the breed) – 12 or more piglets.

For the purpose of comparative evaluation, the indexes of the three groups as a whole were also evaluated. Young boars were selected for fattening and further slaughter, the castration of which was carried out by mechanical method at the age of 4 – 5 days after birth.

All piglets were received in one period, had free access to pre-starter compound feed during the weaning period, and were subsequently fed with starter compound feed, grower and finishing compound feed in accordance with the needs of sex and age groups. All compound feeds were fed dry with free access to water. Animals were housed in the group machines . This stage of research was conducted at the experimental base of Institute of Pig Breeding and AIP NAAS.

The main measurements of pig carcasses were taken after their 24-hour cold aging at the meat processing plant of "Prodfoodservice" LLC in Poltava. Animals with a live weight of 100 kg were selected for evaluation (with a difference between animals of no more than 5 %).

General rules were followed for evaluation of pig carcasses [20]. Measurements of carcasses were determined in a suspended state using a ruler or measuring tape with an accuracy of no less than ± 1 mm, after ripening the carcasses in the following sequence: *the length of the carcass* (half carcass) – with a measuring tape from the edge of the fusion of the pubic bones to the front surface of the first cervical vertebra*; the length of the bacon half* (side) – from the front edge of the pubic bone to the middle of the front edge of the first rib; *the largest* (front) *width of the bacon half* - measured at the level of the 7th thoracic vertebra perpendicular to the half; *the smallest (*back*) width of the bacon half* – was measured at the level of the penultimate lumbar vertebra perpendicular to the half.

The topography of fat deposition on the carcass was determined by the following points of taking measurements of *the thickness of lard with skin*: *at the withers* – at the point with the greatest thickness at the level of the withers; *at the level of 6 – 7 thoracic vertebrae* - above the last rib; *on the waist* – at the point with the smallest thickness at the level of the waist; *on the sacrum at point 1* – at the level of the first sacral vertebra; *on the sacrum at point 2* – at the level of the second sacral vertebra; *on the sacrum at point 3* – the level of the third sacral vertebra; *on the chest* – at the point with the smallest thickness at the level of the chest;

The formula proposed by N. V. Pivniak [21] was used to determine the average thickness of lard along the spine (watering of the carcass):

$$PT = \frac{\text{a} + b + v + ((g + d + \text{e})/3)}{4}$$

where: PT is the average thickness of the lard along the spine; a – on the withers; b – above the 6th–7th thoracic vertebrae; v – above the first lumbar vertebra; g, d, e above the first, second, third sacral vertebrae

To compare animals of different groups of pigs of the Myrhorod breed, the full index of meatiness (PMI) was calculated:

$$PMI = (X/100 + Y/30 + Z/50) - \frac{a + b + c + ((d + e + f)/3) + g}{5}$$

where: PMI is the meatiness of the animal; X – carcass length, cm; Y is the area of the "muscle eye", cm^2; Z – percentage of meat in the carcass, %; a – the maximum thickness of bacon at the withers, mm; b – at the level of the 6th – 7th thoracic vertebra, mm; c – minimum at waist level, mm; d, e, f – above the first, second and third thoracic vertebrae, mm; g – at chest level, mm

The research results were processed using the traditional method of variational statistics [22]. Microsoft Excel was used for statistical data analysis.

Research results and their discussion. The results of the evaluation of the linear measurements of the carcasses of pigs of the Myrhorod breed with different starting possibilities of animals in the neonatal period of development are shown in the table. The differences between the different groups were insignificant in relation to the girth of the sternum. The most contrasting - III and I groups differed from each other in terms of this index by 2.74 %. According to the width indexes of the bacon half of the carcass, there were also no significant differences between different groups of pigs, with a slight shift of preference towards the third group (higher indexes compared to the first group by 2.88 % in the width of the front part of the bacon half and 4.41 % in the width of the back of the bacon half). At the same time, regarding the ratio of the front to the back parts of the bacon halves, the smallest values were found in the animals of the second group, and the largest in the first group.

Regarding the determination of fat thickness at different points of taking measurements, a clear picture regarding the superiority of a certain group was notdetermined, although according to most indexes, the carcasses of animals of the first group were marked by larger actual measurements. At the same time, it should be noted that the animals of all three groups did not meet the requirements of DSTU 4718:2007 [23], which are submitted to the first extra and second categories of pigs for slaughter, according to the indexes of lard thickness at the level of 6 – 7 thoracic vertebrae. Accordingly, all the evaluated carcasses were assigned to the third category - "animals of universal and fatty genotypes, meat with unbalanced long-term fattening", which corresponds to the type of productivity of pigs of the Myrhorod breed.

With regard to the different points of taking measurements, the largest fat thickness was when it was measured at the withers, and the smallest - at the level of the chest. At the same time, according to the comprehensive evaluation of carcass watering, higher values were obtained for the first group, medium values for the second group, and the smallest values for the third group, respectively. However, these differences were not likely. The opposite picture was observed for the full meatiness index, although differences in this index were also unlikely.

Table. Linear measurements of carcasses of the Myrhorod breed pigs, $\overline{X} \pm S_{\overline{X}}$

Indexes	Unit of measurement	A group of animals			In general, for all evaluated animals
		I	II	III	
Group assignment	–	control	experimental	experimental	–
The number of young boars	head	3	3	3	9
The girth of the sternum	cm	61.00±0.707	60.67± 1.080	59.33± 1.080	60.33± 0.500
The width of the front of the bacon half	cm	34.67±0.408	35.00± 0.707	35.67± 0.408	35.11± 0.276
The width of the back of the bacon half	cm	30.33±0.408	31.33± 0.408	31.67± 0.408	31.11± 0.276
Ratio of front to back parts of bacon halves	cm/cm	1.14±0.015	1.12± 0.012	1.13± 0.002	1.13± 0.006
The thickness of bacon at the withers	mm	37.33±1.780	37.67± 0.816	36.67± 0.408	37.22± 0.524
The thickness of the lard is at the level of 6–7 thoracic vertebrae	mm	31.33±0.816	30.67± 0.408	31.00± 1.225	31.00± 0.395
The thickness of the bacon is at the level of the waist	mm	28.67±1.080	28.33± 0.408	28.00± 0.707	28.33± 0.354
The thickness of the fat on the sacrum (the first point of capture)	mm	29.33±0.816	29.33± 0.408	28.00± 1.225	28.89± 0.449
The thickness of the lard on the sacrum (the second point of capture)	mm	20.67±0,408	21.33± 0.408	20.00± 1.414	20.67± 0.433
The thickness of the lard on the sacrum (the third point of capture)	mm	28.33±0.408	28.00± 0.707	27.33± 1.080	27.89± 0.373
The thickness of the lard is at the level of the breast	mm	15.67±0.408	15.00± 0.707	14.67± 1.080	15.11± 0.373
Carcass watering	mm	30.86±0.842	30.72± 0.291	30.19± 0.657	30.59± 0.297
PMI	points	0.22±0.075	0.26± 0.035	0.34± 0.022	0.27± 0.029

If we compare the main and most important indexes of the linear diameters of carcasses of three different groups with the same indexes for all evaluated animals, then in relation to the front to back parts of bacon halves, the thickness of lard at the level of the 6 – 7th thoracic vertebrae, the animals of the third group were the closest to the

average values. At the same time, the animals of the second group were the closest to the average values according to the full meatiness index.

Conclusions. As a result of the conducted research, no dependence of meatness indexes, quality characteristics of pig carcasses, and in particular their salinity, was found on the starting capabilities of animals in the neonatal period of development.

It was found that pig carcasses did not meet the requirements for the first extra and second categories of pigs for slaughter, which indicates that the productivity of the new generation of animals of the Myrhorod breed still belongs to animals of universal and fatty genotypes, although the carcasses according to the lard thickness index are at the level the 6 – 7 thoracic vertebrae were at the lower limit of the third category of pigs for slaughter.

Prospects for further research. In further studies, similar studies should be repeated on a larger number of animals, because the differences found between different groups of animals did not have probable differences in all the evaluated indexes. In further selection work with the Myrhorod breed of pigs, it should be taken into account that selection in recent years has led to an increase in meatiness in animals of this breed, which was reflected in a decrease in the thickness of lard and could have a negative effect on lard quality indexes, therefore, the data of the study are also promising in further work.

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ЛІНІЙНІ ПРОМІРИ ТУШ СВИНЕЙ МИРГОРОДСЬКОЇ ПОРОДИ

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Мета. *Оцінити залежність характеристик туш свиней миргородської породи від стартових можливостей тварин у неонатальний період розвитку.* ***Методи.*** *Було сформовано три групи свиней, що відрізнялись між собою кількістю поросят в гнізді при народженні. З метою порівняльної оцінки визначались також і показники по трьох групах в цілому. Для відгодівлі та подальшого забою відбирались кнурці. Всі поросята були отримані в один період, мали вільний доступ до кормів у відповідності до потреб статево-вікових груп. Даний етап досліджень проводився на експериментальній базі Інституту свинарства і АПВ НААН. Основні проміри туш свиней відбирали на базі м'ясокомбінату ТОВ «Продфудсервіс» м. Полтава. Для оцінки були підібрані тварини живою масою 100 кг. За оцінки туш свиней дотримувались загальних правил. Топографію відкладання жиру на туші визначали за такими точками взяття промірів товщини шпику зі шкірою: на холці; на рівні 6 – 7 грудних хребців; на попереку; на крижах у трьох точках; на рівні грудей. Для визначення середньої товщини шпику по хребту (поливу туші) використовували формулу запропоновану Н. В. Півняк. Для порівняння тварин різних груп свиней миргородської породи розраховували повний індекс м'ясності (ПІМ). Результати досліджень опрацювали традиційним методом варіаційної статистики.* ***Результати.*** *Відносно показника обхвату окосту розбіжності між різними групами були незначними. За широтними показниками беконної половинки туші також значних різниць між різними групами свиней встановлено не було, з незначним зміщенням переваги в бік третьої групи. Стосовно відношення передньої до задньої частин бекон них половинок найменші значення були у тварин другої групи, а найбільші – у першої. Відносно визначення товщини шпику в різних точках взяття промірів чіткої картини стосовно переваги певної групи встановлено не було, хоча й за більшістю показників туші тварин першої групи відзначались більшими фактичними значеннями промірів. Тварини усіх трьох груп за показником товщини шпику на рівні 6 – 7 грудних хребців не відповідали вимогам, що пред'являються до першої екстра та другої категорії свиней для забою. Всі оцінені туші були віднесені до третьої категорії, що й відповідає типу продуктивності свиней миргородської породи. За комплексною оцінкою поливу туші більші значення були отримані по першій групі, середні по другій та найменші по третій, відповідно. Протилежна картина відмічалась за повним індексом м'ясності, хоча й розбіжності за цим індексом також не були вірогідними. За порівняння основних найважливіших показників лінійних промірів туш трьох різних груп із тими ж показниками по всім оціненим тваринам, то по відношенню передньої до задньої частин бекон них половинок, товщині шпику на рівні 6 – 7-х грудних хребців найбільш наближеними до середніх значень були тварини третьої групи. У той же час, за повним індексом м'ясності найбільш наближеними до середніх значень були тварини другої групи.* ***Висновки.*** *У результаті проведених досліджень було виявлено відсутність*

залежності показників м'ясності, якісних ознак туш свиней та зокрема їх осаленості та ін. від стартових можливостей тварин у неонатальний період розвитку. Виявлено не відповідність вимогам, що пред'являються до першої екстра та другої категорії свиней для забою, що свідчить про збереження приналежності за типом продуктивності нової генерації тварин миргородської породи до тварини універсальних та сальних генотипів, хоча й туші за показником товщини шпику на рівні 6 – 7-х грудних хребців знаходились на нижній межі третьої категорії свиней для забою.

Ключові слова: *свині, миргородська порода, забійні якості, туші свиней, шпик, м'ясність, полив туші.*

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