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EFFECT OF PRE-SLAUGHTER WEIGHT AND SEX ON THE PERFORMANCE OF IRISH LANDRACE PIG CARCASSES

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Abstract

In order to study the effect of sex and pre-slaughter weight on the performance of Irish Landrace pig carcasses, 400 pigs with equal number of barrows and gilts were selected and fattened. After fattening, the pigs were divided into two groups according to sex. Then, 20 gilts were selected using weighing into 4 groups with a pre-slaughter weight 90 kg, 100 kg, 110 kg and 120 kg. Similarly, 20 barrows were divided for 4 groups with same pre-slaughter weight 90 kg, 100 kg, 110 kg and 120 kg. All gilts and barrows from eight experimental groups were slaughtered and their carcasses were measured and then sampled to determine slaughter parameters. It was found that in general, gilts had higher carcass weight at pre-slaughter weight 90, 110 and 120 kg, higher chilled carcass weight at pre-slaughter weight 120 kg, higher carcass length and length of bacon halves at pre-slaughter weight 120 kg, higher thickness of longest back muscle and meat content at pre-slaughter weight 100 kg.Barrows had a higher fat thickness above the 6-7 thoracic vertebrae, the fat thickness in the buttocks, the fat thickness in the withers at pre-slaughter weight 100 kg.

Key words**:** *gilts, barrows, slaughter yield, meat content, fat thickness, carcass length*

INTRODUCTION

Pig fattening is the final period in pork production. The level of pigs productivity, the quality of the product and the profitability of pig breeding largely depend on its proper organization. The main purpose of fattening is to obtain maximum growth from animals in the shortest possible time at the lowest cost of feed per unit of output with a high quality product [11, 13]. The quality of the carcass is an important factor that determines the efficiency of production. It is influenced by a number of conditions: the external shape of the animal and its internal structure, namely the ratio of meat and fat, total fat, condition of the animal at slaughter, its age, weight, quality and quantity of feed, methods of slaughter, carcass processing [26]. In the rapidly changing situation of the pork market, the study of slaughter quality of pig meat under the influence of various factors is becoming increasingly important.

Meat productivity is determined by the amount of products obtained from pigs suitable for human consumption. It is estimated by carcass weight and carcass yield [14, 15]. It is known that pig carcasses are affected by genotype and productive type of breed [1]. However, the slaughter quality of pigs also depends on the pre-slaughter weight, which in turn is determined by the intensity of pig growth [25]. As the pre-slaughter weight increases, the slaughter yield, carcass length and fat thickness increase [24]. It is also widely known that in the general understanding of scientists and pork producers an unambiguous decision on the optimal pre-slaughter weight of pork is established. In most European countries, the weight of live animals before slaughter is 110-115 kg. Of course, there are countries, such as Ireland, where pigs are traditionally slaughtered with a pre-slaughter weight of no more than 95 kg to get lean bacon. However, despite the traditional principles of producers and long-term consumer preferences, the development of breeding and genetics of pigs allows to move to heavier carcasses while maintaining their high meat content and save resources [23]. This is confirmed by [27] studies which show that when pigs were reared to a heavy weight of 140 kg, an increase in pre-slaughter weight for every 10 kg decreased the average daily gain by 4.0 g, increased feed consumption by 78.1 g and decreased conversion feed at 0.011 g. The low economic efficiency of growing to heavy weight conditions is indicated by the report [21], which states that the intensity of weight gain is greatly reduced in the later stages of growth when growing to 120 kg and more, due to accelerated fat accumulation and reduced water and protein deposition. In Southern Europe, particularly in Italy, consumer tastes were on the side of pig carcasses with a pre-slaughter weight of more than 150 kg. In the pork market in this country, traditional cured meat with excess fat content is in great demand today. In the Americas, the average pre-slaughter weight is 100-120 kg, in particular in Brazil it is not more than 100 kg [3], in Mexico it is in the range of 120-127 kg [2]. In Asia, including China and South Korea, the pre-slaughter weight of pigs is 90-110 kg, but tends to increase from year to year. Thus, currently the greatest demand is for lean pork, which is obtained when fattening young pigs to a slaughter weight of 90-100 kg [10].

The characteristics of pig carcasses after slaughter depend on various factors. The more closely they are interconnected. In the results of experiments [6] it was proved that with the increase of slaughter conditions from 95–105 to 116–125 kg in pigs was a decrease in the content of meat carcasses and an increase in fat content. Changes in pig carcasses are dynamic and depend on the intensity of their growth. Previously, researchers have reported an increase in the depth of the fat in the pelvic-lumbar part of the carcass linearly, an increase in the thickness of the longest muscle of the back quadratically with increasing live weight [28]. It has been reported increase in fat thickness between the 10th and last ribs was found in the range of 0.8 to 2.6 cm for each additional 10 kg increase in pre-slaughter weight of pigs [12].

Similar findings have been found in other works [29], which indicate the value of the fat thickness in the withers tended to increase with increasing pre-slaughter weight compared to the content of lean meat, which tended to decrease linearly.

Thus, there are still many incomplete relationships between the ratio of pre-slaughter weight and carcass lean parameters, especially in pigs of commercial genotypes, so the study of this issue will become even more relevant in the future, given the trend in breeding pigs to increase carcass weight in the near future decades. Thus, the aim of this study is to find the effect of sex and different pre-slaughter weights on the change in slaughter rates in pigs of commercial genotype of Irish origin.

MATERIALS AND METHODS

In order to achieve this goal, an experiment was conducted to study the influence of sex and pre-slaughter weight of fattening pigs on their slaughter qualities on the basis of

fattening farm №3 «Globinsky Pig Complex» LLC, Globinsky district, Poltava region, Ukraine, where a group of 400 Irish Landrace pigs with equal number of gilts and barrows was formed. In the process of fattening, they were kept 50 heads in identical conditions in pens with area 40 m^2, on a totally slotted concrete floor. Feed was fed 8-10 times a day using feeding equipment Weda (Austria).

Feeding of pigs was carried out with liquid complete feed mixtures of own production in the ratio of dry feed to water 1: 3. Compound feeds were balanced in terms of essential nutrients and energy. Conditions for keeping, watering, ventilation and manure removal were identical for all pigs.

After fattening, the pigs were divided into two groups according to sex. Then, 20 gilts were selected using weighing into 4 groups with a pre-slaughter weight 90 kg, 100 kg, 110 kg and 120 kg. Similarly, 20 barrows were divided for 4 groups with same pre-slaughter weight 90 kg, 100 kg, 110 kg and 120 kg.

Gilts depending on the pre-slaughter weight were included in the groups as follows: 90 kg gilts were included in the control group Ig, 100 kg gilts were included in group IIg, 110 kg gilts were included in group IIIg, 120 kg gilts were included in group IVg. Barrows depending on the pre-slaughter weight were included in the groups as follows: 90 kg barrows were included in control group Ib, 100 kg barrows were included in group IIb, 110 kg barrows were included in group IIIb, 120 kg barrows were included in group IVb.

The pigs were transported to the slaughterhouse «Globinsky Meat Processing Plant» LLC, Globinsky district, Poltava region, Ukraine and slaughtered in accordance with the technology adopted by the company by stunning in the Schaller Butina gas chamber - DK 4300 (Butina ApS, Denmark). The carcasses were cooled after treatment in the first stage using shock tunnels from -14 °C during 105 minutes, in the second stage at 4 °C durinf 24 hours. During slaughter, the carcass parameters were determined: average pre-slaughter weight, slaughter weight, slaughter yield, weight of chilled carcass, cooling losses, cooling losses, fat thickness over 6-7 thoracic vertebrae, fat thickness in the buttocks, fat thickness in withers, carcass length, length of bacon halves, thickness of the longest back muscle, meat content.

Carcass rolling was performed according to the generally accepted method ISO 3100-1 [9].

Carcass measurements were performed on the left half-carcass using a ruler and ultrasound device Fat-o-Meat'er II (Frontmatec, Denmark). The fat thickness was measured with a ruler at 3 points: on the withers, above the 6-7 thoracic vertebrae, on the buttocks. The Fat-o-Meat'er II was measured at the third and fourth last edges of the carcass 6 cm away from the mid-back line. The device determined the thickness of the fat and the thickness of the longest back muscle. At the end of the measurement process, the carcasses were divided into parts and evaluated for lean meat content using the deboning method.

To determine the strength of the influence of sex and pre-slaughter weight of animals on their slaughter performance, a two-factor analysis of variance was performed. The obtained results were calculated biometrically using Microsoft Office Excel 2010 applications.

The animals were cared for and used during the experiment in accordance with the requirements of humane treatment according to applicable Ukraine's Law No 3447/IV, 2006, «On protecting animals from brutal treatment» [20].

RESULTS AND DISCUSSIONS

Slaughter weight in pigs with a pre-slaughter weight 90 kg was significantly higher in gilts than in barrows by 1.7 kg or 2.78% ($p < 0.001$). In pigs with a pre-slaughter weight 100 kg, the slaughter weight did not differ in the carcasses of both sexes (Table 1). Slaughter weight in pigs with a pre-slaughter weight of 110 kg was higher in gilts compared to barrows by 2.5 kg or 3.17% ($p < 0.05$). Similarly, 120 kg gilts had a higher slaughter weight than 120 kg barrows by 3.1 kg or 3.48% ($p < 0.05$). According to the indicators of slaughter yield and cooling losses, there

was no statistically significant difference between gilts and barrows at the pre-slaughter weight 90, 100, 110 and 120 kg. The weight of chilled carcass was higher in gilts than in barrows by 5.8 kg or 6.47% ($p < 0.001$) at pre-slaughter weight 120 kg, and at other weight conditions statistical differences in pigs of different sexes were not found. The fat thickness at the level of 6-7 thoracic vertebrae was greater in barrows compared to gilts at a pre-slaughter weight of 100 kg by 2.6 mm or 12.04% ($p < 0.05$), and at other values of pre-slaughter weight no significant difference was recorded regardless of pigs sex. The fat thickness in the buttocks was greater in barrows compared to gilts at a pre-slaughter weight 100 kg by 5.9 mm or 44.70% ($p < 0.001$), and at other pre-slaughter weights it had no statistically significant difference in other pigs. The fat thickness in the withers was higher in barrows from group IIb (100 kg) compared to gilts from group IIg (100 kg) by 3.1 mm or 8.07% ($p < 0.01$), and in analogues from other groups of cross-sex no difference was found. The carcass length and the length of the bacon halves were 3.7 cm or 3.74% ($p<0.01$) and 3.5 cm or 3.99% higher than in gilts with a pre-slaughter weight 120 kg. (0.05), respectively, and in the value of indicators among pigs of both sexes of different pre-slaughter weights there was no difference. The thickness of the longest back muscle was probably higher in gilts at pre-slaughter weights 100 kg compared to 100-kg barrows by 4.2 cm^2 or 8.47% ($p < 0.01$), it did not differ at other pre-slaughter weights in barrows and gilts carcasses.

Table 1. Slaughter qualities of pigs with different pre-slaughter weight, (n = 20)

Indicators	**Gilts**			
	Ig (90 kg)	**IIg (100 kg)**	**IIIg (110 kg)**	**IVg (120 kg)**
Average pre-slaughter weight, kg	84.1±0,71	92.3±0.91	105.5±0.97	116.67±0.73
Slaughter weight, kg	$62.8±0.62^{B3}$	$69.1±0.88^{A3}$	$78.9±0.99^{A3B1}$	$89.0±0.83^{A3B1}$
Slaughter yield, %	73.4±0.83	74.8±0.52	74.7±0.32	76.2±0.49
Weight of chilled carcass, kg	60.9±0.61	$67.7±0.88^{A3}$	$77.2±0.94^{A3}$	$89.7±0.82^{A3\ B3}$
Cooling losses, kg	1.8±0.48	1.4±0.02	1.7±0.20	2.2±0.13
Cooling losses, %	2.9±0.74	2.0±0.04	2.1±0.25	2.5±0.14
Fat thickness, cm:				
over 6-7 thoracic vertebrae, mm	18.6±1.55	21.6±0.62	$25.3±1.52^{A2}$	$27.4±1.30^{A3}$
in the buttocks, mm	14.3±2.08	13.2±1.02	17.7±0.85	18.0±1.58
in withers, mm	34.±1.21	$38.4±0.50^{A2}$	$42.1±3.12^{A1}$	$45.8±2.25^{A3}$
Carcass length, cm	87.1±1.01	89.9±1.47	93.0±0.62	$98.9±0.53^{B2}$
Length of bacon halves, cm	80.8±1.82	79.8±1.02	82.3±0.51	$87.7±1.25^{A3B1}$
Thickness of the longest back muscle, cm^2	47.2±2.45	$49.6±1.17^{B1}$	45.8±0.79	51.6±1.94
Meat content,%	$53.4±0.83^{A3}$	$52.1±0.48^{B1}$	49.4±0.55	49.5±1.40
Indicators	**Barrows**			
	Ib (90 kg)	**IIb (100 kg)**	**IIIb (110 kg)**	**IVb (120 kg)**
Average pre-slaughter weight, kg	83.3±0.33	92.3±3.01	102.7±0.54	113.2±0.90
Slaughter weight, kg	61.1±0.23	$68,.0±0.77^{A3}$	$76.4±0.61^{A3}$	$85.9±0.81^{A3}$
Slaughter yield, %	73.3±0.35	73.7±2.84	74.4±0.81	$75.8±0.39^{A3}$
Weight of chilled carcass, kg	59.6±0.21	$66.5±1.05^{A3}$	$75.1±0.60^{A3}$	$83.9±0.76^{A3}$
Cooling losses, kg	1.4±0.08	1.5±0.12	1.3±0.24	1.9±0.10
Cooling losses, %	$2.4±0.13^{A1}$	2.2±0.16	1.5±0.29	2.2±0.11
Fat thickness, cm:				
over 6-7 thoracic vertebrae, mm	19.4±1.31	$24.2±0.95^{A2\ B1}$	$26.5±0.77^{A3}$	$30.5±1.91^{A3}$
in the buttocks, mm	17.5±1.55	$19.1±0.86^{B3}$	17.1±1.21	20.6±0.87
in withers, mm	35.1±1.58	$41.5±0.87^{A2\ B2}$	$43.1±0.84^{A3}$	48.6±2.71
Carcass length, cm	89.7±1.04	90.8±0.99	91.6±0.70	$95.2±0.92^{A3}$
Length of bacon halves, cm	79.0±0.53	79.7±0.89	$82.8±0.79^{A3}$	84.2±0.65
Thickness of the longest back muscle, cm^2	49.2±1.61	45.4±1.38	49.1±2.95	52.3±1.57
Meat content,%	$54.4±0.78^{A3}$	50.5±0.57	51.8±0.97	50.6±0.98

Note: Comparison between columns: ^{A1} – $P < 0.05$; ^{A2} – $P < 0.01$; ^{A3} – $P < 0.001$; Comparison between lines: ^{B1} – 0.05; $P < {}^{B2}$ - $P < 0.01$; ^{B3} - $P < 0.001$;
Source: Own calculations.

The meat content was higher in carcasses of gilts at a pre-slaughter weight 100 kg by 1.6% ($p < 0.05$) and in carcasses of barrows at a pre-slaughter weight 110 kg by 2.4% ($p < 0.05$). The meat content for weights 90 and 120 kg was the same for pigs of different sexes.

Based on the obtained results, it became known that gilts from the control group with a pre-slaughter weight 90 kg had a lower carcass weight than gilts with a pre-slaughter weight 100 kg by 6.3 kg or 10.03% ($p < 0.001$) than gilts with a pre-slaughter weight 110 kg by 42.7 kg or 67.99% ($p < 0.001$) than gilts with pre-slaughter weight 120 kg by 53.8 kg or 85.78% ($p < 0.001$). According to the slaughter yield indicator, there was no statistically significant difference between gilts of all groups. Evaluation of the weight of chilled carcass showed that gilts with a pre-slaughter weight 100 kg were superior to analogues from the control group Ig by 6.8 kg or 11.17% ($p < 0.001$), gilts with a pre-slaughter weight 110 kg, were superior to peers with 90 kg and 16.3 kg or 26.77% ($p < 0.001$), and gilts with a pre-slaughter weight 120 kg were heavier than control gilts by 28.8 kg or 47.29% ($p < 0.001$). A significant difference in the rate of cooling losses between gilts of all groups was not detected. The fat thickness above the 6-7 thoracic vertebrae was the lowest in 90 kg of gilts and was 18.6 mm, which was lower than in gilts of group IIIg (110 kg) by 6.7 mm or 36.02% ($p < 0.01$) and lower than in gilts group IVg (120 kg) by 8.8 mm or 47.31% ($p < 0.001$).

The fat thickness in the buttocks of gilts with different pre-slaughter weights was statistically equal. The fat thickness in the withers in gilts from the group Ig (90 kg) was 34.5 mm, which was thinner than in gilts with a pre-slaughter weight 100 kg by 3.9 mm or 11.30% ($p < 0.01$), thinner than in gilts with a pre-slaughter weight 110 kg by 7.6 mm or 22.03% ($p < 0.05$) and thinner than in 120 kg of gilts by 11.3 mm or 32.75% ($p < 0.001$). Gilts from the control group Ig (90 kg) in terms of the length of the bacon half were lower compared to analogues from IVg (120 kg) by 6.9 cm or 8.85% ($p < 0.001$), and from gilts of other groups it did not differ significantly. The thickness of the longest back muscle did not show statistically significant differences in gilts of all groups. The meat content was the highest in gilts with a pre-slaughter weight 90 kg and amounted to 53.4%, which was higher than 110 kg gilts by 4.0% ($p < 0.001$) and higher than 120 kg analogues by 3.9% ($p < 0.001$).

A study of the slaughter weight showed that it was highest in barrows with a pre-slaughter weight 120 kg. Barrows from control group Ib (90 kg) had a lower carcass weight than barrows from group IIb (100 kg) by 6.9 kg or 11.29% ($p < 0.001$), than barrows from group IIIb (110 kg) by 15.3 kg or 25.04% ($p < 0.001$), than barrows from group IVb (120 kg) by 24.8 kg or 40.59% ($p < 0.001$). In terms of slaughter yield, there was a significant difference of 2.5% ($p < 0.001$) between barrows with a pre-slaughter weight 90 kg and 120 kg in favor of heavier pigs. The lowest weight of chilled carcass was naturally found in barrows of the control group, where it was lower than in analogues from group IIb (100 kg) by 6.9 kg or 11.58% ($p < 0.001$) than peers from group IIIb (110 kg) by 15.50 kg or 26.01% ($p < 0.001$) than by experimental barrows from group IVb (120 kg) by 24.3 kg or 40.77% ($p < 0.001$). Cooling losses were significantly different only for barrows with pre-slaughter weight 90 kg and 110 kg, where the highest rate was in barrows of group Ib (90 kg) by 0.9% ($p < 0.05$). There was no significant difference between the values of this indicator in barrows of other groups. Estimation of the fat thickness above the 6-7 thoracic vertebrae showed the lowest values in barrows with a pre-slaughter weight 90 kg. Barrows of this group were inferior to analogues: with a pre-slaughter weight 100 kg by 4.8 mm or 24.74% ($p < 0.01$), with a pre-slaughter weight 120 kg by 7.1 mm or 36.60% ($p < 0.001$), with pre-slaughter weight 120 kg by 11.1 mm or 57.22% ($p < 0.001$). The fat thickness in the buttocks did not differ significantly in barrows with different pre-slaughter weight. The fat thickness in the withers in barrows from group Ib (90 kg) was probably lower than in barrows from group IIb (100 kg) by 6.4 mm or 18.23% ($p < 0.01$)

than in barrows from group IIIb (110 kg) by 8.0 mm or 22.79% ($p < 0.001$) than in barrows from group IVb (120 kg) by 13.5 mm or 38.46% ($p < 0.001$). The carcass length had a significant excess only in 120 kg barrows over analogues with a pre-slaughter weight 90 kg by 5.5 cm or 6.13% ($p < 0.001$). The length of the bacon half was higher in barrows with a pre-slaughter weight 110 kg by 3.8 cm or 4.81% ($p < 0.001$) and in barrows with a pre-slaughter weight 120 kg by 5.2 cm or 6.58% ($p < 0.001$) relative to analogues from the control group with a pre-slaughter weight 90 kg. The thickness of the longest back muscle was statistically equal in the carcasses of barrows of all groups. The content of meat in the carcass was the highest in barrows from control group Ib (90 kg) and exceeded the indicators of analogues from group IIb (100 kg) by 3.9% ($p < 0.001$), analogues from group IIIb (110 kg) by 2, 6% ($p < 0.05$), peers from group IVb (120 kg) by 3.8% ($p < 0.01$).

Dispersion two-factor analysis of the influence of sex and pre-slaughter weight on pig carcasses showed the presence of significant influence of these factors (Fig. 1). The meat content significantly depended on 19.49% of the pre-slaughter weight ($F_{13.38} > F_{crit2.66}$), 2.10% of the sex ($F_{4.33} > F_{crit3.90}$), 4.57% of the factor of the interaction of sex and pre-slaughter weight ($F_{3.13} > F_{crit2.66}$) and 73.82% of unaccounted factors.

The thickness of the longest back muscle was significantly affected only by the factor of pre-slaughter weight by 13.98% ($F_{8.68} > F_{crit2.66}$), and the other studied factors had no significant effect. Factors not taken into account in the study had an impact on the indicator at the level of 81.61%.

The level of cooling losses was influenced by the factor of pre-slaughter weight with a force of 5.31% ($F_{2.86} > F_{crit2.66}$), unaccounted factors influenced with a force of 93.89%, and other factors had no effect.

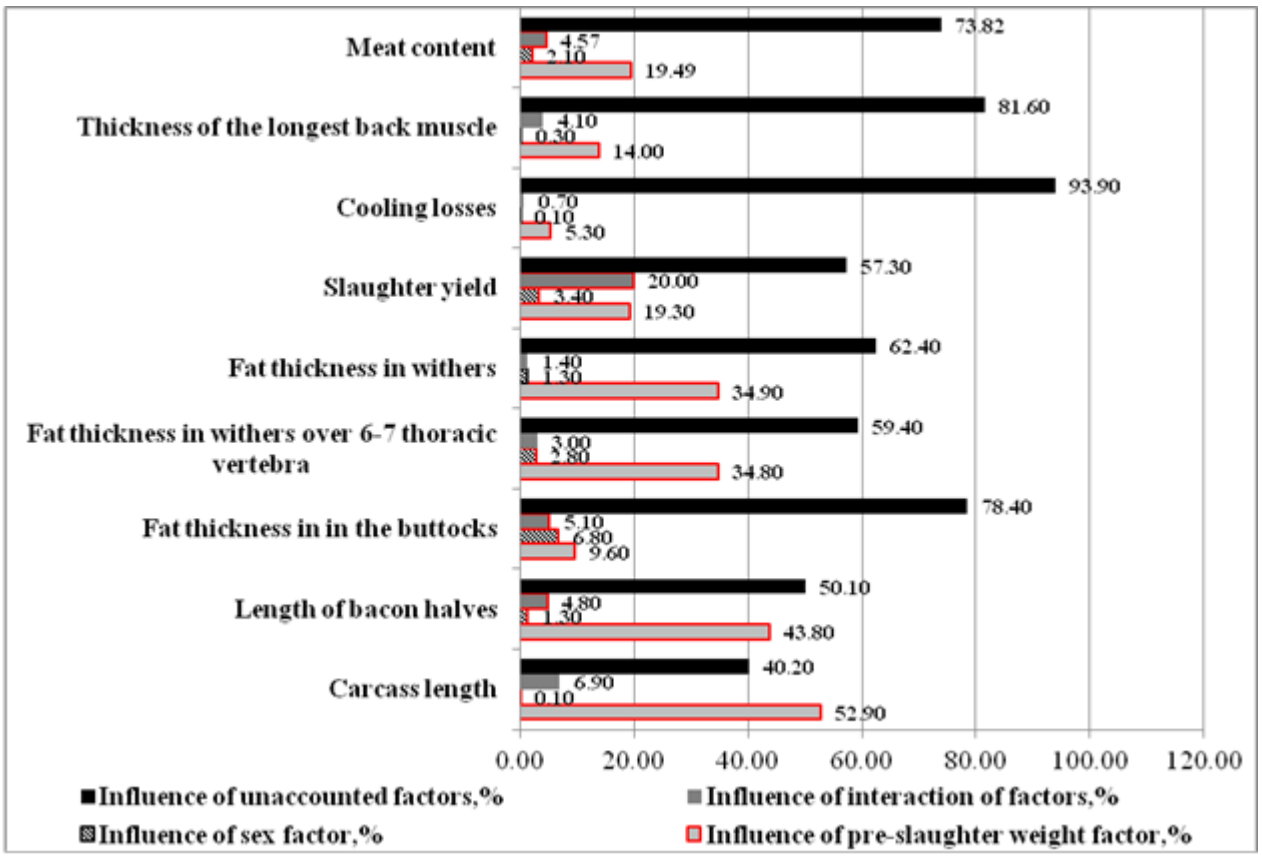

Fig. 1. The strength of the impact of pre-slaughter live weight and sex on the slaughter performance of pig carcasses
Note: (red frame - significant impact, without frame - unreliable impact);
Source: Own calculations.

Slaughter yield significantly depended on the pre-slaughter weight by 19.33% ($F_{17.09}$> $F_{crit2.66}$), on sex by 3.37% ($F_{8.95}$> $F_{crit2.66}$), on the factor of their interaction by 19.99% ($F_{17,68}$> $F_{crit2.66}$) and from unaccounted factors by 57.29%.

The fat thickness in the withers was affected by the pre-slaughter weight by 39.91% ($F_{28.34}$> $F_{crit2.66}$), and unaccounted for factors by 62.40%, and did not depend on sex and its interaction with the pre-slaughter weight factor.

The fat thickness above the 6-7 thoracic vertebrae was influenced by both the pre-slaughter weight factor and the sex factor by 4.87% ($F_{29.70}$> $F_{crit2.66}$) and 40.39% ($F_{7.09}$> $F_{crit3.90}$), respectively. Unaccounted factors had an impact of 49.86% on this indicator of pig carcasses.

The length of the bacon half was under the influence of pre-slaughter weight at 43.76% ($F_{44.27}$> $F_{crit2.66}$), under the influence of sex at 1.32% ($F_{4.01}$> $F_{crit3.90}$), under the influence of their interaction at level 4.82% ($F_{4.88}$> $F_{crit2.66}$) and under the influence of unaccounted factors at the level of 50.08%.

Pre-slaughter weight affected the fat thickness in the buttocks with a force of 9.64% ($F_{6.23}$> $F_{crit2.66}$), and sex and its interaction with the pre-slaughter weight at 6.84% ($F_{13.28}$> $F_{crit3.90}$) and 5.13% ($F_{3.31}$> $F_{crit2.66}$), respectively.

The carcass length depended on the pre-slaughter weight by 52.85% ($F_{55.69}$> $F_{crit2.66}$), on the interaction of sex and pre-slaughter weight by 6.87% ($F_{8.68}$> $F_{crit2.66}$) and on unaccounted for factors by 40.15%.

Published studies [5] have shown a significant increase in the fat thickness on the abdomen, with an increase in carcass weight from 107 to 125 kg. We were able to confirm this in our research. But contrary to the publications [8], wich said that the thickness of the fat on the back increased with increasing carcass weight, we had no such increase. There have also been reports [5] that with increasing pre-slaughter weight, there has been a general trend to increase the thickness of the longest back muscle. Similar data are available in other publications, which indicate that the thickness of the longest back muscle was 1.47 times greater in pigs at slaughter weight 130 kg compared to analogues at 110 kg [4]. Other published experiments on slaughter carcasses of Irish Landrace pigs have shown that for each increase in the fat thickness in the withers at pre-slaughter weight 110 kg by 1.0 mm, the thickness of the longest back muscle of pigs carcasses will also increase proportionally by 3.01 cm^2, and it will decrease by 3.005 mm at pre-slaughter weight 130 kg on the contrary [16]. We did not find similar results, but found that at pre-slaughter weight 100 kg, the thickness of the longest back muscle in pigs carcass was 8.47% greater in gilts than in barrows, and that the pre-slaughter weight did not change.

The researchers reported that the cooling losses at the pre-slaughter weight of pigs 120 kg were higher compared to the pre-slaughter weight of pigs 100 kg, both in absolute and relative terms [22]. However, we had a slightly opposite result, which did not coincide with such a statement. We were able to find that the cooling losses were higher in barrows with a pre-slaughter weight of 90 kg compared to their counterparts at a pre-slaughter weight of 100 kg by 0.9%.

It is also reported that the carcasses of commercial fattening pigs of the Irish Landrace with a pre-slaughter weight 120 kg significantly outweighed the pigs with a pre-slaughter weight 110 kg in terms of meat content in the whole carcass by 1.5 kg or 3.72% and in terms of its thirds: in cervical-scapular by 16.06%, in dorsal-lumbar by 17.37%, in pelvic-femoral by 8.02% [17]. As the pre-slaughter weight of barrows increased, the meat content in their carcass decreased (P <0.01), while light carcasses (90 kg) had an advantage of 1.43% compared to the carcasses of heavy barrows (P <0.01) [7]. In our experiment, we found a similar manifestation of changes in the meat content in the carcass. The meat content was higher than the lower pre-slaughter weight 90 kg and decreased with its increase to 120 kg. Therefore, we cannot agree with the published report [18], which says that the meat content in carcasses also increased with the pre-slaughter weight of pigs. Our general conclusions about

changes in carcass in gilts coincide with the reports in the manuscripts [31], which indicate that in general, gilts had higher ($p < 0.05$) carcass weight, the thickness of the longest back muscle and slaughter yield. Also, our results did not coincide with the reports [19], which indicate that there is no difference between gilts and barrows in fat thickness and carcass length. Our conclusions coincided with the general changes in carcass slaughter rates with increasing pre-slaughter weight, as reported in the published work [30].

CONCLUSIONS

Although the slaughter weight of both gilts and barrows increased with the pre-slaughter weight.

But the slaughter yield, cooling losses, meat content and thickness of the longest back muscle were not statistically significant and remained stable with increasing growth rates from 90 kg to 120 kg in pig carcasses.

With an increase in the pre-slaughter weight to 120 kg, there was an increase in the fat thickness, the carcass length and the length of the bacon half in both gilts and barrows.

In general, the gilts had a higher carcass weight at pre-slaughter weight 90, 110 and 120 kg, a higher weight of chilled carcass at pre-slaughter weight 120 kg, a higher carcass length and a length of bacon halves at pre-slaughter weight 120 kg, a higher thickness of longest back muscle and meat content at pre-slaughter weight 100 kg.

Barrows had a higher fat thickness above the 6-7 thoracic vertebrae, the fat thickness in the buttocks, the fat thickness in the withers at a pre-slaughter weight 100 kg.

Dispersion two-factor analysis showed a significant dependence of slaughter carcasses of gilts and barrows on the pre-slaughter weight of pigs.

Sex significantly affected the slaughter yield, meat content, the fat thickness above the 6-7 thoracic vertebrae, the fat thickness in the buttocks, the length of the bacon halves, carcass length.

The factor of sex and pre-slaughter weight significantly affected the slaughter yield, meat content, the length of the bacon half and the carcass length.

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