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# EFFECT OF SLAUGHTER WEIGHT AND SEX ON SLAUGHTER TRAITS AND MEAT QUALITY OF POLISH AUTOCHTHONOUS ZLOTNICKA SPOTTED PIGS CROSSBRED WITH DUROC*

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**Abstract**

**The aim of this study was to investigate the impact of slaughter weight and sex on slaughter traits and meat quality of Zlotnicka Spotted x Duroc (ZS×D) hybrid fatteners. The material comprised 56 Zlotnicka Spotted × Duroc fatteners (28 barrows and 28 gilts) which were fattened to 245th day of life. Pigs were divided into the following three groups: Group I (n=16) <110 kg; Group II (n=23) ≥110 ≤120 kg, and Group III (n=17) >120 kg. The obtained results revealed influence of the final body weight on slaughter trait values with the exception of meatiness. Fatteners from the group with the highest weight were characterised by the thickest backfat as well as by the greatest height of the loin eye. Slaughter weight exerted a significant impact on protein content, water absorbability as well as on the pH of the *longissimus thoracis et lumborum* (LTL) muscle. As to the influence of sex on slaughter traits, it was found that gilts were characterised by smaller backfat thickness and higher carcass meatiness than barrows. On the other hand, no effect of the slaughter weight and sex on colour parameters and sensory quality of the LTL muscle was ascertained. All the examined parameters were at high level in all slaughter weight and sex groups. The obtained results suggest that the slaughter of ZS×D crossbreds in groups I and II exerts a beneficial influence on slaughter trait levels and, at the same time, allows maintenance of high meat quality.**

**Key words: native swine, crossbreed, fatteners, gilts, barrows**

Swine meatiness improvement observed in recent years leads to reduction of subcutaneous and intramuscular fat (Gajewczyk et al., 2014; Czyżak-Runowska et al., 2015; Põldvere et al., 2015). Intramuscular fat content reduction exerts a negative influence on pork sensory features, technological and culinary usefulness and its content can be modified only slightly by appropriate nutrition (Wood et al., 1999; Skiba et al., 2012).

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Autochthonous swine breeds reared in various European countries are characterised by high intramuscular fat content which exerts a beneficial influence on good quality and exceptional sensory value of meat obtained from them (Bermúdez et al., 2012; Lorenzo et al., 2012; Szulc et al., 2012 a, 2012 b; Franco and Lorenzo, 2013; Temperán et al., 2014; Franco et al., 2016). Zlotnicka Spotted, Zlotnicka White and Pulawska are three native pigs bred in Poland. However, the above-mentioned breeds are rarely used for commercial production of fatteners because they are characterised by lower results of fattening and slaughter performance in comparison with most popular breeds such as Polish Landrace and Polish Large White (Szulc et al., 2011, 2012 b). To improve values of these traits in autochthonous pigs it is possible to cross them with the Duroc breed which is characterised by good results of fattening and slaughter traits as well as by high meat quality (Szulc et al., 2012 b; Franco et al., 2014; Gajewczyk et al., 2014; Põldvere et al., 2015). Trefan et al. (2013) demonstrated that sex exerts a significant influence on meat quality characteristics, including its colour, IMF content as well as on tenderness and juiciness.

In the process of attempting to improve slaughter performance and, at the same time, to maintain adequate meat quality, it is also necessary to determine the optimal slaughter weight of hybrid fatteners (Fischer et al., 2006; Maiorano et al., 2007).

Although lots of studies determined effect of sex on slaughter traits and meat quality (Costa-Lima et al., 2014), its impact in Zlotnicka Spotted breed and hybrids is poorly investigated. However, experiments conducted on other autochthonous breeds – Iberian, Celta, Cinta Senese, Casertana – revealed that sex exerted a significant influence on the development of slaughter traits, whereas majority of parameters characterising meat quality failed to be affected by this factor (Maiorano et al., 2007; Franco and Lorenzo, 2013; Franco et al., 2014). In turn, Robina et al. (2013) for the Iberian × Duroc crosses, did not find significant effect of sex on carcass quality traits. The above results encourage to undertake research concerning the use of Zlotnicka Spotted in crossbreeding with Duroc. Similar results were obtained by Muñoz et al. (2011) for Iberian swine. In studies conducted by Trefan et al. (2013), Costa-Lima et al. (2014) and Franco et al. (2014), it was demonstrated that sex exerts a significant influence on meat quality characteristics, including its colour, intramuscular fat (IMF) content as well as on tenderness and juiciness.

The objective of this study was to investigate the impact of the final slaughter weight and sex on slaughter traits and meat quality of Zlotnicka Spotted × Duroc crossbred fatteners.

## Material and methods

Data for research were obtained from documentation of an individual farm situated in the Wielkopolskie Voivodeship (Poland – 52°5'N, 18°0'E). The material comprised 56 Zlotnicka Spotted × Duroc (ZS×D) fatteners (28 barrows and 28 gilts). The young pigs were marked using for this purpose permanent individual tattoo numbers on their ears. Each pig had its own number. Then the animals were fattened from

102 to 245 days of life. Fatteners were divided into the following three groups on the basis of their slaughter weight at 245th day of life (the fattening lasted 144 days): Group I (8 barrows and 8 gilts) – fatteners with slaughter weight of <110 kg; Group II (12 barrows and 11 gilts) – weight of ≥110 ≤120 kg, and Group III (8 barrows and 9 gilts) – animals with weight of >120 kg. The animals were kept in identical conditions in 4 pens on shallow litter (straw). Fourteen animals (7 barrows and 7 gilts) were kept in each pen. During the fattening, the animals were fed *ad libitum* complete feed mixtures prepared on the farm (Table 1). Two types of complete diet were used. Grower mixture was fed from the start of the fattening, when animals weighed about 30 kg (102nd day of life) to 70 kg slaughter weight. Finishing mixture (Finisher) was used from 70 kg of slaughter weight to day of slaughter (245th day of life). Pigs were weighed twice, the first time on the day of fattening initiation and then on the day of slaughter. The abattoir was situated about 30 km from the farm. Fatteners were stunned using electric current employing a Polish COMA apparatus. Approximately 30 minutes after slaughter, carcasses obtained from fatteners were weighed with up to 100 g accuracy and evaluated with the assistance of a French Sydel Company CGM optical-needle device by determining backfat thickness behind the last rib, the height of the loin eye and meatiness. Additionally, slaughter yield was also determined.

The pH measurements 45 minutes ($pH_{45}$) and 24 hours ($pH_{24}$) after slaughter were taken in the *longissimus thoracis et lumborum* (LTL) muscle at the level of the last rib using a portable Radiometr PHM 80 pH-meter equipped in a combined electrode.

Samples weighing approximately 500 g were collected from the lumbar part of the LTL muscle for laboratory examinations. The muscle samples were taken between the second and third lumbar vertebrae. The following parameters were determined in raw meat samples: water content according to the PN-ISO 1442 (2000) standard; intramuscular fat content according to the PN-ISO 1444 (2000) standard (Soxhlet method); protein content by Kjeldahl method (PN-75/A-04018) employing a Tecator Company equipment; water holding capacity (WHC) with the Grau-Hamm method (1952) as modified by Pohja and Niinivaara (1957).

Meat colour parameters (using Minolta Chroma CR 400 apparatus) were estimated in the CIE system: L* – lightness value, a* – redness value, b* – yellowness value. To determine size of drip loss, approximately 100 g of the LTL muscle samples, after weighing, were placed in a plastic foil bag and left in a refrigerator for 48 hours at 4°C. Afterwards, samples were dried and weighed and the result was calculated from the difference in mass. Size of the cooking loss was determined on the basis of meat mass loss during cooking. Weighed samples (about 100 g) were cooked until they reached the temperature of 75°C in the geometric centre of the sample and then they were cooled at room temperature. The results were calculated from the difference in mass before and after cooking (Baryłko-Pikielna, 1975).

Samples in the shape of a cylinder 2.5 cm in diameter were cut out from the LTL muscle and cooked to reach the temperature of 75°C. The sensory assessment of the cooked meat in a 1 to 5 point scale (1 – the worst, 5 – the best) was carried out by a trained, 15-person team who evaluated aroma, juiciness, tenderness and palatability (PN-ISO 4121:1998).

This study received acceptance and agreement of the Local Ethical Committee for the Animal Experiments (resolution no: 56/2008 dated 18.07.2008).

Table 1. Composition of diets used during fattening

| Item | Diet[1] | |
|---|---|---|
| | grower (about 30–70 kg b.w.) | finisher (70 kg b.w. – day of slaughter) |
| Dry matter (%) | 90.28 | 90.52 |
| Energy (MJ/kg) | 12.63 | 12.41 |
| Crude protein (%) | 17.31 | 15.85 |
| Digestible protein (%) | 14.65 | 13.43 |
| Crude fibre (%) | 4.16 | 4.17 |
| Crude fat (%) | 1.95 | 2.02 |
| Ash (%) | 4.98 | 4.97 |
| Ca (%) | 0.79 | 0.79 |
| P (%) | 0.62 | 0.62 |
| Lysine (g/kg) | 9.96 | 8.61 |
| Methionine/Cystine (g/kg) | 6.08 | 5.78 |
| Tryptophan (g/kg) | 2.07 | 1.87 |

[1] Age at the beginning of fattening – 102 days of life; slaughter age was 245 days of life.
b.w. – body weight.

The obtained results were statistically processed (PROC GLM) by means of the statistical package SAS® v. 9.2 (SAS 2011). Differences among slaughter weight groups of pigs with regard to analysed traits were determined employing the two-way linear model of ANOVA:

$$Y_{ijk} = \mu + \alpha_j + \beta_k + i(sws) + e_{ijk}$$

where:

$Y_{ijk}$ is value of the analysed trait,
$\mu$ is mean of the trait,
$\alpha_j$ is constant effect of i$^{th}$ group of pig (i=I, II, III),
$\beta_k$ is constant effect of j$^{th}$ sex (j=1,2),
*i(sws)* is slaughter weight × sex interaction,
$e_{ijk}$ is effect of experimental error.

In order to evaluate differences between sexes the Student test was used. The significance of the differences between the mean values was verified by means of the Duncan's test. The distribution of analysed traits was normal.

## Results

### Slaughter traits

The slaughter traits of fatteners depending on slaughter weight and sex are presented in Table 2. The slaughter weight significantly ($P\leq0.05$) influenced hot carcass weight, slaughter yield, backfat thickness and height of loin eye, but did not affect meatiness. Fatteners from group I were characterised by higher slaughter yield in comparison with other groups. The difference (by about 6.44 percentage points) was statistically confirmed.

The highest backfat thickness was observed for group III (33.82 mm). Height of loin eye was significantly greater for group III (51.23 mm).

There were significant differences ($P\leq0.01$) between the sexes for backfat thickness and meatiness. Gilts presented higher meatiness (by 3.23 percentage points) and lower backfat thickness (by 7.71 mm) than barrows.

### Physicochemical traits

In the present study (Table 3) it was found that the slaughter weight exerted a significant ($P\leq0.05$) influence on protein content, water absorption as well as $pH_{45}$ and $pH_{24}$ levels. Pigs from group I had higher (by about 0.81 percentage points) protein content than other experimental groups. On the other hand, the highest WHC was observed in group III (34.41%).

The results of the $pH_{45}$ and $pH_{24}$ assessment in the *longissimus thoracis et lumborum* (LTL) muscle in the analysed groups of sex were characteristic for the meat without quality deviations ($pH_{45}$ above 6.3 and $pH_{24}$ fluctuating around 5.5). The highest value of $pH_{45}$ and $pH_{24}$ was found in groups II and I, respectively.

Fatteners from all slaughter weight groups were characterised by high intramuscular fat content (3.57%), however the differences were not significant.

In the meat derived from barrows a significantly lower ($P\leq0.01$) cooking loss was found in comparison with the result recorded for gilts (by about 2.7 percentage points). Higher IMF, by 0.40 percentage points, was noted in barrows.

### Sensory assessment

Table 4 presents the evaluation results of the *m. longissimus thoracis et lumborum* (LTL) sensory quality taking into consideration the impact of the slaughter weight and sex on these traits. The following parameters were subjected to evaluation: aroma, juiciness, tenderness and palatability. All the examined sensory quality parameters were very good. However, there were no significant differences between sexes. The effect of final body weight of fatteners on these traits was not also confirmed statistically.

Table 2. Slaughter traits of fatteners depending on slaughter weight and sex

| Item | Traits | | | | | |
|---|---|---|---|---|---|---|
| | slaughter weight (kg) mean ± SD | hot carcass weight (kg) mean ± SD | slaughter yield (%) mean ± SD | backfat thickness (mm) mean ± SD | height of loin eye (mm) mean ± SD | meatiness (%) mean ± SD |
| Slaughter weight | | | | | | |
| group I n = 16 | 103.00±3.77 a | 86.94±4.67 a | 84.47±4.66 c | 27.87±6.10 a | 44.12±4.77 a | 44.63±4.28 |
| group II n = 23 | 114.61±2.90 b | 91.52±3.63 b | 79.93 ± 4.30 b | 28.56±6.06 a | 43.83±10.86 a | 44.69±3.04 |
| group III n = 17 | 127.06±4.13 c | 96.76±6.29 c | 76.13 ± 3.67 a | 33.82±8.87 b | 51.23±6.85 b | 42.82±5.56 |
| P value | 0.017 | 0.011 | 0.012 | 0.030 | 0.015 | 0.342 |
| Sex | | | | | | |
| barrows n = 28 | 116.11±10.63 | 91.96±6.96 | 79.44 ± 4.67 | 33.82±8.20 B | 48.21±9.79 | 42.49±4.28 A |
| gilts n = 28 | 114.03±9.31 | 91.64±5.24 | 80.70 ± 5.81 | 26.11±5.87 A | 44.12±7.43 | 45.72±3.71 B |
| P value | 0.441 | 0.845 | 0.371 | <0.0001 | 0.083 | 0.003 |

A, B – mean values in columns with a different letter differ significantly at $P \leq 0.01$.
a, b, c – mean values in columns with a different letter differ significantly at $P \leq 0.05$.

Table 3. Assessment results of physicochemical traits of the *longissimus thoracis et lumborum* (LTL) muscle depending on slaughter weight and sex

| Item | Traits | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | WC (%) means± SD | IMF (%) means± SD | PC (%) means ± SD | WHC (%) means ± SD | DL (%) means± SD | CL (%) means ± SD | $pH_{45}$ means± SD | $pH_{24}$ means± SD | L* means± SD | a* means± SD | b* means± SD |
| Slaughter weight | | | | | | | | | | | |
| group I n = 16 | 70.05±1.71 | 3.59±1.09 | 25.21±1.24 b | 31.66±2.70 a | 2.06±0.67 | 27.80±4.03 | 6.32±0.19 a | 5.52±0.14 b | 47.16±7.04 | 10.23±1.61 | 9.94±2.08 |
| group II n = 23 | 70.80±1.60 | 3.80±0.96 | 24.26±1.19 a | 31.03±3.38 a | 2.71±0.91 | 27.48±3.18 | 6.48±0.24 b | 5.45± 0.09 a | 47.79±5.13 | 10.18±1.04 | 10.66±1.89 |
| group III n = 17 | 71.10±1.81 | 3.33±0.84 | 24.55±1.35 a | 34.41±2.31 b | 2.74±1.36 | 27.33±2.43 | 6.32±0.18 a | 5.43± 0.08 a | 50.86±4.54 | 10.17±1.20 | 10.65±1.53 |
| P value | 0.275 | 0.340 | 0.048 | 0.021 | 0.084 | 0.061 | 0.028 | 0.038 | 0.138 | 0.987 | 0.422 |
| Sex | | | | | | | | | | | |
| barrows n = 28 | 70.24±1.89 | 3.80±1.06 b | 24.39±1.21 | 32.14±3.29 | 2.59±1.00 | 26.19±2.26 A | 6.34±0.20 | 5.47±0.13 | 47.51±6.49 | 9.99±1.30 | 10.01±2.11 |
| gilts n = 28 | 70.62±1.56 | 3.40±0.84 a | 24.88±1.35 | 32.24±3.17 | 2.45±1.06 | 28.88±3.52 B | 6.43±0.24 | 5.47±0.09 | 49.45±4.80 | 10.40±1.20 | 10.07±1.46 |
| P value | 0.826 | 0.043 | 0.162 | 0.907 | 0.602 | 0.001 | 0.153 | 0.850 | 0.207 | 0.224 | 0.085 |

WC – water content, IMF – intramuscular fat content, PC – protein content, WHC – water holding capacity, DL – drip loss, CL – cooking loss.
Colour parameters: L* – lightness, a* – redness, b* – yellowness.
A, B – mean values in columns with a different letter differ significantly at $P \leq 0.01$.
a, b – mean values in columns with a different letter differ significantly at $P \leq 0.05$.

Table 4. Results of sensory evaluation of the *longissimus thoracis et lumborum* (LTL) muscle depending on slaughter weight and sex

| Item | Traits | | | |
|---|---|---|---|---|
| | aroma* means ± SD | juiciness* means ± SD | tenderness* means ± SD | palatability* means ± SD |
| Slaughter weight | | | | |
| group I n = 16 | 4.38±0.14 | 4.07±0.14 | 4.17±0.26 | 4.33±0.14 |
| group II n = 23 | 4.42±0.12 | 4.16±0.27 | 4.06±0.19 | 4.38±0.18 |
| group III n = 17 | 4.39±0.15 | 4.19±0.33 | 4.18±0.23 | 4.45±0.19 |
| P value | 0.061 | 0.367 | 0.075 | 0.138 |
| Sex | | | | |
| barrows n = 28 | 4.33±0.15 | 4.21±0.29 | 4.18±0.26 | 4.42±0.19 |
| gilts n = 28 | 4.40±0.15 | 4.08±0.22 | 4.10±0.20 | 4.35±0.16 |
| P value | 0.089 | 0.054 | 0.121 | 0.064 |

* The sensory assessment of the cooked meat in a 1 to 5 point scale (1 – the worst, 5 – the best).

## Discussion

From among the examined slaughter traits, backfat thickness is particularly important because of its economic significance. It is well known that the crossbreeding of native pigs with Duroc reduces backfat thickness and improves meatiness (Szulc et al., 2011; Robina et al., 2013). The values of slaughter traits established in these studies were similar to the results obtained in earlier studies conducted on Zlotnicka Spotted × Duroc (ZS×D) crossbreds (Szulc et al., 2011; Szulc et al., 2012 a; Szulc et al., 2012 b). Analysing the impact of the slaughter weight on backfat thickness it was demonstrated that the animals with the highest final body weight (>120 kg) were characterised by a significantly thickest backfat in comparison with the animals from the groups with lower slaughter weight. The obtained result is consistent to this noted by Maiorano et al. (2007) for Italian native Casertana pigs and by Barowicz et al. (2006) for Polish Landrace. Also Sládek et al. (2004) reported that the slaughter weight of animals exerted a significant effect on backfat thickness. In our study, a significant impact was also established of the final body weight on the height of the loin eye.

In contrast to Barowicz et al. (2006) and Sládek et al. (2004), in our research, no influence of the slaughter weight on the meatiness of the examined pigs was found. On the other hand, our research results are corroborated by studies on the slaughter performance of ZS pigs as well as their crossbreds (Szulc et al., 2011; Szulc et al., 2012 b). Similar results were also obtained for a Slovenian Krškopolje autochthonous breed by Furman et al. (2010) and Čandek-Potokar et al. (2003) for which they reported mean backfat thickness of 33 mm and meatiness at the level of 47.80%.

Analysing the effect of sex on backfat thickness and meatiness of the examined fatteners, it was found that barrows were characterised by thicker backfat and lower meatiness. The obtained research results were consistent with Serrano et al. (2009) for crossbreds of Iberian and Duroc breed and with Maiorano et al. (2007) for the Italian native Casertana breed. In turn, Robina et al. (2013) found no significant differences between sexes in relation to backfat thickness, carcass length, carcass yield, ham length, etc. for Iberian × Duroc pigs. Although barrows showed heavier carcass weight, worse loin and ham yields were found in this sex. On the other hand, Kapelański et al. (2006) failed to demonstrate any impact of sex on backfat thickness (mean from 5 measurements) and meatiness of Zlotnicka Spotted pigs.

Intramuscular fat (IMF) content is an important physicochemical trait associated, among others, with meat water absorbability and colour. IMF value ranging from 2.0% to 3.5% is assumed to be appropriate in order to obtain optimal sensory quality of meat products (Wood et al., 1999). It was proved that the native pigs and their crossbreds are characterised by high IMF (Serrano et al., 2009; Robina et al., 2013). Also, fatteners from all slaughter weight groups were characterised by high intramuscular fat content which is in keeping with the earlier studies conducted by Szulc et al. (2012 a). This is probably due to the fact that native breeds such as the Zlotnicka Spotted are kept in conservative breeding. The aim of conservative breeding is to maintain genetic variation within the population while preserving the original characteristics of the breed. Among these characteristics is also IMF. Babicz et al. (2009) for the native Pulawska × Duroc crossbreds as well as Furman et al. (2010) for the Slovenian native Krškopolje breed also demonstrated a high (about 3%) intramuscular fat content. In this study, the authors did not observe any impact of the slaughter weight on the IMF level which is consistent with experiments carried out by Lo Fiego et al. (2010) on Camborough/PIC hybrids. Fatteners investigated by the above-mentioned researchers did not exhibit significant differences in the intramuscular fat content depending on the body weight on the day of slaughter. In addition, they also failed to observe impact of sex on IMF. On the other hand, statistically significant differences in the IMF content between barrows and gilts recorded in our investigations were corroborated by Serrano et al. (2009) in their study on Iberian/Duroc crossbreeds. Our results were also confirmed by other authors (Font i Furnols et al., 2009; Morales et al., 2011; Franco et al., 2014). As Power and Schulkin (2008) explain, testosterone plays an important role in lipolysis as well as lipoprotein lipase activity inhibition. This enzyme provides fatty acids from blood to cells where fat is produced.

The present study found that the slaughter weight exerted a significant influence on protein content, water absorption as well as on $pH_{45}$ and $pH_{24}$ levels (Table 3). With respect to the protein content in the LTL muscle, its highest quantities were determined in muscles derived from the fatteners characterised by the lowest slaughter weight. On the other hand, this trait was not found to be influenced by sex, contrary to experiments conducted by Serrano et al. (2009) and Costa-Lima et al. (2014) who reported significantly higher protein content in the muscles obtained from gilts in comparison with those from barrows.

The results of the $pH_{45}$ and $pH_{24}$ assessment in the *longissimus thoracis et lumborum* (LTL) muscle in the analysed groups of final body weight and sex (Table 3) were characteristic for the meat without quality deviations. A similar result was reported by Trefan et al. (2013) for the meat derived from pigs of different sexes (boar-piglet, surgically castrated boar-piglets, immunologically castrated boar-piglets and gilts) slaughtered at different body weights. Also Szulc et al. (2012 a) for ZS×D crossbreds demonstrated that $pH_{45}$ of meat, on average, amounted to 6.18 and that of $pH_{24}$ – to 5.51. Similarly, Babicz et al. (2009) reported comparable pH values for Pulawska × Duroc and Pulawska Wild boar crossbreeds. There were no differences between sexes in relation to meat pH in our study. However, Franco and Lorenzo (2013) observed significant differences between gilts and barrows in relation to this trait. Our research revealed that the level of the cooking loss depended on the sex of the animals; smaller loss was recorded in barrows.

Meat colour is an important criterion employed by consumers for pork assessment and is a feature characterising its quality (Gajewczyk et al., 2014). The meat of the fatteners, irrespective of the slaughter weight and sex, was darker in comparison with some commercial and autochthonous pigs (Rybarczyk et al., 2010; Gajewczyk et al., 2014; Temperán et al., 2014; Czyżak-Runowska et al., 2015). Similar L* (47.33) values were reported by Szulc et al. (2012 a) for ZS×D pigs as well as by Babicz et al. (2009) for crossbreds of Pulawska × Duroc and Franco et al. (2016) for Celta breed. In our study, neither the final body weight nor sex was observed to influence meat colour. A similar result was obtained by Maiorano et al. (2007) for the native Italian Casertana breed. Also Serrano et al. (2009) failed to observe any impact of sex on the colour parameters (L*, a*, b*) of meat obtained from Iberian ´ Duroc pigs.

In our study all the examined sensory quality (aroma, juiciness, tenderness and palatability) parameters had high values. Comparable sensory quality results were reported by Szulc et al. (2012a) for Zlotnicka Spotted × Duroc pigs.

The performed analysis failed to exhibit any effect of the slaughter weight on the sensory quality parameters of *m. longissimus thoracis et lumborum* (LTL). This result differed from that reported by Barowicz et al. (2006) who demonstrated a more intensive aroma in animals slaughtered at lower body weight.

The previous studies showed contradictory effects of sex on sensory quality of meat. Costa-Lima et al. (2014) did not find any difference in sensory evaluation between (surgically and immuno) castrated males and gilts. Flavour and purchase intention were the only parameters influenced by sex. However, Jonsäll et al. (2001) reported that meat *(biceps femoris)* from castrates was more tender and more juicy than meat from gilts. In this study no effect of sex on sensory meat traits was found. However, an inconsiderable tendency to high values of analysed features (especially juiciness and palatability) were observed in barrows. It is related to higher content of IMF in castrated males. A greater IMF content may result in more tenderness and juiciness of the meat (Morales et al., 2011). In our study protein content in meat was a little bit higher compared to Rybarczyk et el. (2010) and Gajewczyk et al. (2014).

The obtained research results revealed a significant impact of final body weight on the development of slaughter traits. Zlotnicka Spotted × Duroc crossbreds achieved the best slaughter trait values when the slaughter weight did not exceed 120 kg. Simultaneously, meat derived from this group of animals was characterised by the best physicochemical parameters. The slaughter weight did not exert a significant influence on meat sensory quality.

In the case of the effect of sex on slaughter traits, it was found that gilts showed much higher meatiness and they had lower backfat thickness in comparison with barrows. However, the meat of the gilts seems less tasty, which could have been due to lower IMF content and higher cooking loss. This is also confirmed by the trends observed with regard to sensory characteristics. The obtained research results suggest that the slaughter of ZS×D crossbreds in groups I and II exerts a beneficial influence on slaughter trait levels and, at the same time, allows maintenance of high meat quality.

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