

## ANALYSIS OF CHANGES IN LEAN MEAT CONTENT OF FATTENING PIGS ON SELECTED FARMS IN THE LUBLIN VOIVODESHIP IN 2012-2014

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### Abstract

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The material for analysis consisted of pig carcasses weighing 80–90 kg from three farms located in the south-eastern part of the Lublin Voivodeship (from the villages of Lipowiec, Dęby and Gorajec). Commercial crossbreeding of pigs on these farms is based on the use of Polish Large White x Polish Landrace sows and Duroc x Piétrain boars. The analysis covered the years 2012–2014. The lean meat content of the carcasses obtained from each of the producers was characterized on the basis of an arithmetic mean ( $\bar{x}$ ) for each farm and year of production. The percentage distribution of the carcasses in each of the classes S, E, U, R, O, and P was analysed as well. The lean meat content of the carcasses evaluated can be considered good. On each of the farms analysed carcasses in classes E and S were predominant. However, the decline in average meatiness on the farms in Lipowiec and Gorajec in the last year of the analysis (2014) with respect to the previous years is worrisome. A thorough analysis should be conducted on these farms to determine the cause of the reduction in meat content. The differences in the meat content of the carcasses from the farms analysed are the result of different environmental factors on these farms, mainly diet and housing conditions.

*Key words:* meat content, pigs, EUROP system

### Intriduction

The carcass value of pigs and the quality of pork meat have long been a subject of interest for both scientists and technology specialists at processing plants (Strzelecki et al., 2001; Stasiak et al., 2005; Cebulska et al., 2010; Sieczkowska et al., 2010; Atanassova, 2013; Szostak, 2013). At the turn of the 21<sup>st</sup> century the lean meat content in the pig population increased rapidly, attaining a level of about 55%. This was linked to the implementation of objective, instrument-based classification of carcasses under the EUROP system and to the practice of paying suppliers based on this classification (Borzuta and Lisiak, 2011).

The efficiency of pig production depends on both genetic and environmental factors. Through appropriate cross breeding we can obtain better economic results than in the case of raising or breeding of purebred animals. On the other hand, improper use of foreign breeds in commercial production, particularly *Piétrain* and Belgian Landrace, leads to deterioration in pork quality due to the *RYRI* gene in these pigs (Kurył, 1998). For this reason Danish breeders do not use the *Piétrain* breed for pork production, but have achieved excellent results with four-breed crosses using Yorkshire x Landrace sows and Duroc x Hampshire boars (Borzuta et al., 2007). Taking advantage of the experience of foreign producers, Polish producers have also begun to implement

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effective four-breed cross patterns which do not include *Piétrains*.

A study by Borzuta et al. (2010) showed that crossbreeds produced using  $F_1$  sows obtained by mating Polish Large White with Polish Landrace and  $F_1$  boars obtained by mating Hampshire with Duroc had high lean meat content exceeding 58%. According to the authors, genetic factors are one of the main elements determining the carcass value of pigs as raw material for production of meat and meat products. Using appropriate genetic selection, a visible or even dramatic increase in lean meat content can be obtained in a relatively short time. Optimization of nutrition is then sufficient to stabilize and further improve this level of meat content.

Another extremely important element influencing meat content is nutrition. An appropriate quantity and quality of fodder ensures higher carcass value. An equally important question is the quality and degree of feed conversion by the animals. The more easily assimilated the fodder, the lower the feed consumption per unit of weight gain, resulting in more profitable pig farming (Lipiński, 2013).

Recent years have seen a substantial increase in the lean meat content of pork pigs, which according to Koćwin-Podsiadła and Krzęcio (2005) is the result of intensive selection of breeding herds and of the use of foreign breeds with high meat content in commercial cross-breeding.

The aim of the study was to analyse the lean meat content of pig carcasses from three farms in the Lublin Voivodeship and the percentage distribution of carcasses in each class of the EUROP system.

## Materials and Methods

The study was carried out at the Wrębiak-Witkowski meat processing plant (Zakład Przetwórstwa Mięsnego Wrębiak-Witkowski Sp. z o. o.) in Tomaszów Lubelski, Poland. The plant has been subject to obligatory classification of pig carcasses since 2005. Half-carcasses are classified according to the EUROP system using a CGM (Capteur Gras/Maigre) apparatus by Sydel, operated by authorized and trained personnel. The CGM is a hand-held device equipped with an optical probe that measures the thickness of the loin muscle and the fat layer by measuring the light reflected in the probe. The device determines the lean meat content of the carcass, i.e. the ratio of the total weight of the striated muscles to the weight of the carcass, which is weighed no later than 45 minutes after the animal is stunned.

The material for analysis consisted of pig carcasses weighing 80–90 kg from three farms located in the south-eastern part of the Lublin Voivodeship (from the villages of Lipowiec, Dęby and Gorajec). Commercial crossbreeding

of pigs on these farms is based on the use of Polish Large White x Polish Landrace sows and Duroc x Piétrain boars. The analysis covered the years 2012–2014.

The lean meat content of the carcasses obtained from each of the producers was characterized on the basis of an arithmetic mean ( $\bar{x}$ ) for each farm and year of production. The percentage distribution of the carcasses in each of the classes S, E, U, R, O, and P was analysed as well.

## Results and Discussion

In Table 1 are presented data concerning the number of carcasses analysed and the average lean meat content of the carcasses obtained from the three farms in 2012–2014. Analysis of the data shows that the meatiness of carcasses from the farm in Dęby successively increased, from 54.1% in 2012 to 54.9% in 2014, so that the difference between these years was 0.8%. The reverse tendency can be observed in the case of the other two farms, where the average lean meat content in 2014 was lower than in 2012 and 2013. On the farm in Gorajec the lean meat content of the carcasses in 2014 was 53%, which was lower by 2.8% than in 2013. A similar tendency indicating a decrease in average meatiness can be observed in the case of the farm in Lipowiec, where meat content in 2014 was 53%, which was lower by 2.9% than in the previous year.

**Table 1**

**Average lean meat content of carcasses from different farms during the period analysed**

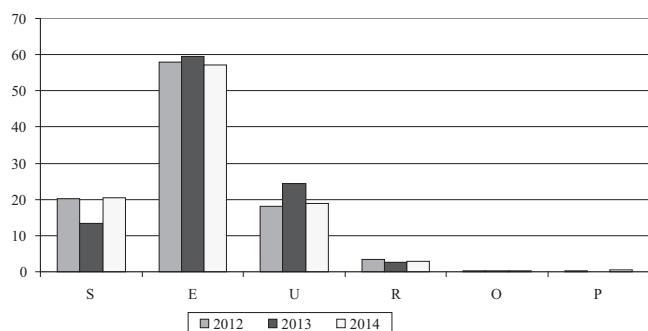
Farm	Year					
	2012		2013		2014	
	n	x, %	n	x, %	n	x, %
Dęby	902	54.1	1153	54.8	1714	54.9
Gorajec	1105	55.4	1669	55.8	1362	53
Lipowiec	1312	55.2	2320	55.9	1158	53

In comparing the average meat content of carcasses on the farms analysed, it should be emphasized that only the farm in Dęby can claim somewhat higher meatiness in comparison with the national average, which according to the literature is about 54%.

The average meat content for all of the carcasses analysed ranged from 53.0% to 55.9%. This is a good result, similar to the mean meat content of fatteners slaughtered in Poland. Borzuta et al. (2010) in a comparative study of the carcass value of four-breed and two-breed crosses used in commercial production, found meat content of 58% in the four-breed crosses and 52% in the two-breed crosses. Antosik and Koćwin-Podsiadła (2010), analysing fattening pigs

from the total Polish population, obtained similar results to ours for the percentage content of meat in the carcass – 57.96%. Considerably higher meatiness in comparison with our results, at a level of 58%, was noted by Siczowska et al. [2010] in a population of fatteners of four breed groups.

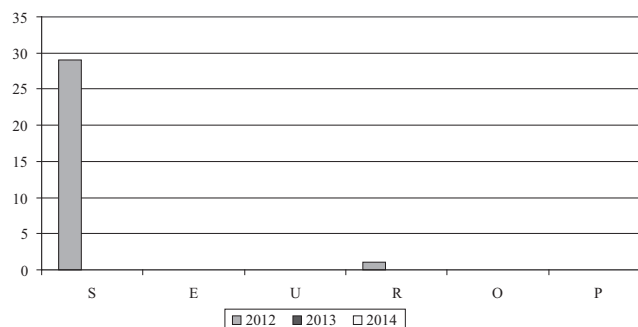
Figure 1 illustrates the percentage distribution of carcasses from the farm in Dęby in the EUROP classes in 2012–2014. The highest percentage of carcasses was in class E – 57.9% in 2012, 59.5% in 2013 and 57.1% in 2014. Class S, with the highest meatiness, had similar percentages of carcasses in 2012 and 2014 (20.1–20.4%), but a much lower percentage in 2013 – 13.3%. A comparatively large proportion of carcasses were assigned to class U, with the highest percentage in 2013, at 24.3%. Marginal numbers of carcasses were assigned to classes R, O and P.



**Fig. 1. Percentage distribution of carcasses from the Dęby farm in SEUROP classes**

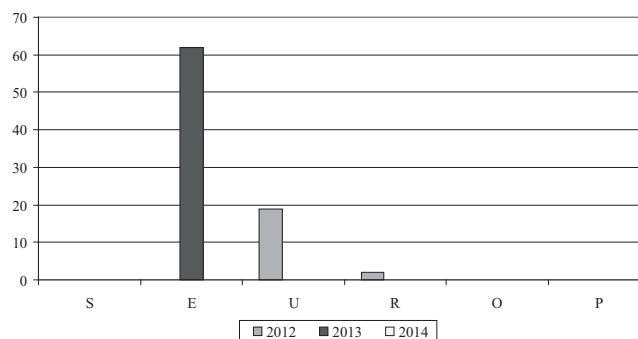
Figure 2 shows the results of the classification of carcasses from the farm in Gorajec. The data clearly indicate that carcass quality on this farm varied widely in the years 2012–2014. The number of carcasses in class S in each year was highly varied. In 2012 this class included 29% of carcasses, but by the following year the percentage of carcasses in this class had fallen to 18.8%. In the following year this indicator had risen slightly to 23.1%. The percentage of carcasses in class E was more stable, ranging from 54.5% to 59.5%. The highest percentage was attained in the final year. High variation during the period analysed was noted for the percentage of carcasses in class U, where the difference between 2013 and the other two years was about 8%. In the remaining EUROP classes the percentage of carcasses was negligible.

Data characterizing the meat content of the carcasses from the farm in Lipowiec are shown in Figure 3. Here we can see a considerable decrease in the percentage of carcasses assigned to class E in 2014. The decrease with respect to the previous two years was 8.8% and 9.1%. Carcasses in class S also showed a downward trend in the final period. The difference between the percentage of carcasses in this



**Fig. 2. Percentage distribution of carcasses from the Gorajec farm in SEUROP classes**

class in 2014 and 2013 was 0.9%. A worrisome increase was noted in the percentage of carcasses in classes with lower meat content, i.e. class U (an increase of over 5%), class R (an increase of over 3%) and class O – about 1%.



**Fig. 3. Percentage distribution of carcasses from the Lipowiec farm in SEUROP classes**

On all the analysed farms the greatest number of carcasses were assigned to class E. A considerable percentage of carcasses were also assigned to the highest class, i.e. class S, with meat content over 60%. A similar proportion of carcasses in classes S and E, at a level exceeding 80%, have been reported by other authors (Antosik et al., 2010).

The meatiness of fattening pigs depends mainly on their genotype, which is why we speak of highly meaty (paternal) breeds and less meaty (maternal) breeds. Skilled crossbreeding increases the likelihood of obtaining not only better reproductive traits but also better traits characterizing fattening and meat performance. This is due to heterosis, which is the effect of crossbreeding. In the present study the parentage of the pigs was similar, which means that the differences in the meat content of the carcasses resulted from different environmental conditions on the farms analysed. The importance of environmental factors for production of highly meaty pigs

– particularly diet, which should be based on high-protein fodder – cannot be overstated.

## Conclusions

The lean mean content of the carcasses evaluated can be considered good. On each of the farms analysed carcasses in classes E and S were predominant. However, the decline in average meatiness on the farms in Lipowiec and Gorajec in the last year of the analysis (2014) with respect to the previous years is worrisome. A thorough analysis should be conducted on these farms to determine the cause of the reduction in meat content.

The differences in the meat content of the carcasses from the farms analysed are the result of different environmental factors on these farms, mainly diet and housing conditions.

The obligatory SEUROP classification of carcasses, with which the price of fatteners is linked, has had a positive influence on the meat content of carcasses. Higher prices for higher meat content lead pig breeders to search for breeding material of high genetic value, ensuring high content of meat in the carcass.

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