Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 17, Issue 4, 2017
PRINT ISSN 2284-7995, E-ISSN 2285-3952

THE DYNAMICS OF PIG CARCASSES CLASSIFICATION IN ROMANIA BETWEEN 2009–2015, BY MANUAL METHOD THE ZWEI PUNKTE

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Abstract

This paper presents the analysis of the evolution of pig carcasses classification in Romania by the method: Zwei Punkte (ZP), during 2009-2015. This method of classification is generally used in low-capacity slaughterhouses, which in the previous year sacrificed less than 200 pig heads /week. The data were gathered from the national classification commission and from the specialty inspectors. The data were processed, analyzed and interpreted as to the number of pigs carcasses classified by this method. Also, the evolution of the quality of the carcasses classified by manual method ZP was also analyzed. The quality of the carcasses was assessed on the basis of the following indicators: the thickness of the subcutaneous fat layer, the thickness of the Gluteus medius muscle and the percentage of lean meat in the carcass, as well of their correlation. The best quality of carcasses classified by the ZP method was recorded in 2014 with an average of 60.0% lean meat. During the analyzed period the carcass quality has a high constancy without any special fluctuations.

Key words**:** *carcasses, pig, classification method, quality*

INTRODUCTION

European legislation on the classification of pig carcasses has long been applied. [1,7, 8, 10] In Romania there are used three methods of pig carcasses classification, from which one is a manual method and two use optical probe.
The Zwei Punkte (ZP) classification method is a manual grading method of pig carcasses. The accuracy of this manual method depend by the human factor. The method is used only in slaughterhouses which slaughtered in the previous year below the average of 200 pig heads/week. [2,3]

MATERIALS AND METHODS

Determination of the estimated average percentage of lean meat in the carcasses, according to which the carcass quality class is established, shall be calculated by using the calculation formula: [2,5,6, 12]
$Y = 50,89767 - 0,70985 \times X1 + 0,26457 \times X2$,
where:
Y = the estimated percentage of lean meat in the carcass;
X1 = the thickness of the bacon (including rind) above the Gluteus medius muscle, determined to a minimum (mm);
X2 = the thickness of the muscle between the medullary canal and the anterior tip of the Gluteus medius in a straight line (mm).
This formula was established following the national dissection test. [3,4]

RESULTS AND DISCUSSIONS

The principal functions of the carcasses classification are to monitor the pig market situation; establish an average price for pig carcasses which can be used for reference price calculations; make price quotations comparable throughout all EU member states. [11]

Analysis of the number of carcasses classified by the Zwei Punkte method

The analysis of the number of carcasses classified by this method reflects the development of the pork sector in Romania in the last years.

The recorded data regarding on the classification of pork carcasses by the Zwei Punkte method during 2009-2015, their number as well as their percentage of the total carcasses classified each year are presented in Table 1.

Table 1. Number and weight of carcasses classified in Romania between 2009 and 2015 by Zwei Punkte method

Year	Number of carcasses	% from total
2009	426,156	14,9
2010	331,227	12,2
2011	338,646	11,0
2012	238,857	7,1
2013	162,166	4,4
2014	233,228	5,9
2015	175,843	4,3

Source: Own calculation, based on the statistical data from CCC EUROP.RO, 2017 [10] and from Classification Agencies

It was noted that from year to year the percentage of classified carcasses by ZP method decrease from 14.9% (426,156 carcasses) in 2009 to 4.3% (175,843 carcasses) in 2015. It can be said that this is a significant reduction.

The graphical representation of the classified carcasses by ZP method from the total carcasses classified in 2009-2015 is shown in Fig. 1.

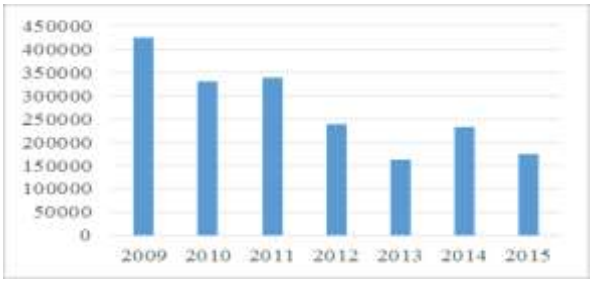

Fig. 1. Evolution of the number of pig carcasses classified in Romania between 2009 and 2015 (heads) by Zwei Punkte Method

Source: own design based on the statistic data from CCC EUROP.RO, 2017 and from Classification Agencies

The constant reduction in the share of carcasses classified by this method shows, that in Romania in recent years the number of slaughtered pigs has increased. At the same time, the number of authorized slaughterhouses remained relatively constant, thus increasing the average slaughtered pigs /week.

As a result we can make a conclusion that, the number of abattoirs in which the carcasses classification was replaced the manual method of classification with semiautomatic methods, which used optical probe. At the same time, the precision of the classification operation has increased.

Analysis of the average weight of carcasses classified by the ZP manual method during 2009 - 2015

Between 2009-2015 the average weight of the carcasses recorded each year of the analyzed period is presented in Table 2 and Figure 2.

Table 2. The average weight of the carcasses classified by the Zwei Punckte method, between 2009 and 2015

Year	2009	2010	2011	2012	2013	2014	2015
The weight of warm carcasses	75.5	78.5	75.0	76.8	76.0	76.5	76.5

Source: Own calculation, based on the statistic data from CCC EUROP.RO, 2017 [10] and from Classification Agencies

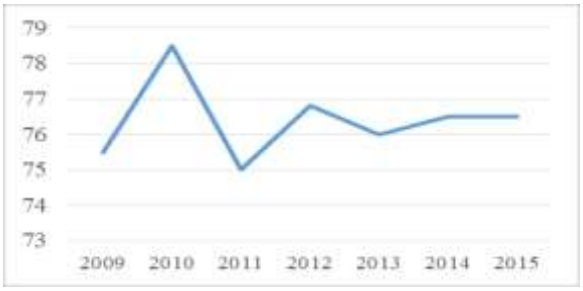

Fig. 2. Evolution of weight of warm carcasses classified in Romania between 2009 and 2015 by Zwei Punkte Method (kg)

Source: Own design based on the statistic data from CCC EUROP.RO, 2017 and from Classification Agencies

It is noted that the average weight of the carcasses classified by this method is constantly maintained. The highest weight was recorded in 2010, the only year in which no

financial support was given to the pig breeding sector.

The uniformity of the carcasses weight is maintained even though this method is also classified the carcasses obtained from the pigs raised in individual household or from local and traditional breeds like Mangalița and Bazna etc. These local breeds have a great variability of characters (weight, quality, yield, etc.).

Analysis of the quality of carcasses classified by the Zwei Punkte method, during 2009 - 2015

The quality of the carcasses is assessed by reference to the average percentage of lean meat estimated from the total carcasses weight. The calculation formula is specific to each grading method and it is used based on the measured thickness values of subcutaneous fat and Gluteus medius muscle.

The average thickness of the muscle (Gluteus medius) determined in each year of the analyzed period is as follows:

There is an improvement in carcasses quality over the analyzed period, the average thickness of the bacon decreasing from 14.2 mm in 2010 to 12.9 - 13.2 mm in the years 2014 and 2015.

Table 3. The average thickness of the muscle (Gluteus medius) for the carcasses graded using ZP method, between 2009 and 2015 (mm)

	2009	2010	2011	2012	2013	2014	2015
The thickness of the bacon layer	13.4	14.2	13.5	13.3	13.1	12.9	13.2

Source: Own calculation, based on the statistic data from CCC EUROP.RO, 2017 [10] and from Classification Agencies

The thickness of the bacon in the calculation formula of lean meat in the carcass has a greater influence than the thickness of the muscle. The thickness of the bacon is inversely proportional to the percentage of lean meat.

The second element underlying the determination of the carcass quality is the thickness of the muscle.

In the analyzed period, the mean thicknesses of the Gluteus medius muscle thickness measured with the manual ZP method are shown in the table 4 and figure 4.

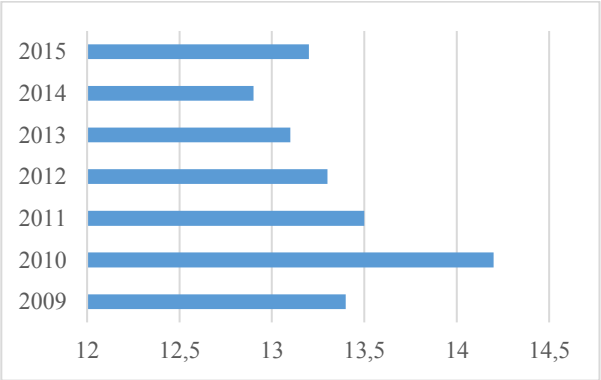

Fig. 3. Evolution of the tickness of bacon layer at the carcasses classified in Romania between 2009 and 2015 by Zwei Punkte Method (mm)

Source: Own design based on the statistic data from CCC EUROP.RO, 2017 and from Classification Agencies

Table 4. The thickness of the muscle Gluteus medius measured by Zwei Punkte method of classification, between 2009 and 2015 (mm)

Year	2009	2010	2011	2012	2013	2014	2015
The thickness of the muscle	68.8	69.1	69.1	67.5	69.2	69.2	67.8

Source: Own calculation, based on the statistic data from CCC EUROP.RO, 2017 [10] and from Classification Agencies

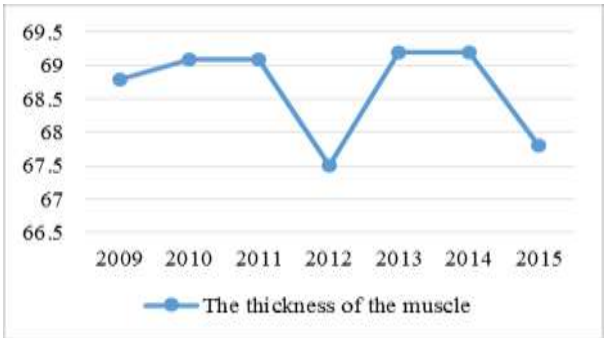

Fig. 4. Evolution of the muscle Gluteus medius thickness at the carcasses classified in Romania between 2009 and 2015 by Zwei Punkte Method (mm)

Source: Own design based on the statistic data from CCC EUROP.RO, 2017 and from Classification Agencies

The value of the thickness of the muscle influences proportionally the percentage of lean meat in the carcass. If this indicator has a larger size, it is obtained a higher quality of the carcasses.

Regarding the uniformity of this parameter, it was observed that in 2012 the lowest value was recorded (67.5 mm), and in the years 2013 and 2014 the average thickness of the muscle had the highest value, namely 69.2 mm.
The values thus determined indicate a fairly high constancy of the thickness of the muscle.
The estimated percentage of lean meat in the carcass is a criterion according to which it is determined to fit into the corresponding quality class of the carcasses. It is based on the values and correlations between this two mentioned and analyzed parameters. It is important the relationship between them.
Also it can be seen in table 5 and figure 5, there are differences in carcasses quality even if the same annual mean thickness of the Gluteus medius muscle is recorded.
However, even if in two consecutive years the average thickness of the muscle was the same, namely 69.1 mm both in 2010 and in 2011, the carcasses quality was higher in 2011.
This is because the average thickness of bacon was lower in 2011 by 0.7 mm than in 2010.

Table 5. Comparative status of uniformity of thickness of subcutaneous fat and Gluteus Medius muscle (mm)

	Year						
	2009	2010	2011	2012	2013	2014	2015
% of lean meat in the carcasses	59.6	59.1	59.6	59.3	59.9	60	59.5

Source: Own calculation, based on the statistic data from CCC EUROP.RO, 2017 [10] and from Classification Agencies

Table 6. The average annual percentage of lean meat recorded between 2009 and 2015 in carcasses classified by the Zwei Punkte method

Year	2009	2010	2011	2012	2013	2014	2015
Fat tickness	13.4	14.2	13.5	13.3	13.1	12.9	13.2
Muscle (Gluteus medius) tickness	68.8	69.1	69.1	67.5	69.2	69.2	67.8

Source: Own calculation, based on the statistic data from CCC EUROP.RO, 2017 [10] and from Classification Agencies

A similar situation was found also in the years 2013 and 2014, when at identical values of the thickness of the muscle, different values of the thickness of the subcutaneous fat layer were recorded. It is also noted, that the best quality report was recorded in 2014. In this year, the bacon layer had the lowest average of 12.9 mm and it was correlated with the highest value of the thickness of the muscle, 69.2 mm.

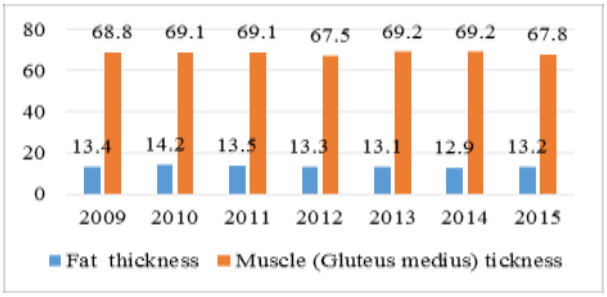

Fig. 5. Uniformity of thickness of the bacon correlated with the thickness of the muscle (Gluteus medius) at the carcasses classified in Romania between 2009 and 2015 by Zwei Punkte Method (mm)
Source: own design based on the statistic data from CCC EUROP.RO, 2017 and from Classification Agencies

As a result of the estimated average percentage of lean meat in the carcass based on the calculation formula and the values determined by the ZP method of the two parameters (thickness of subcutaneous fat and Gluteus medius muscle), it was recorded the evolution presented in Fig.6.

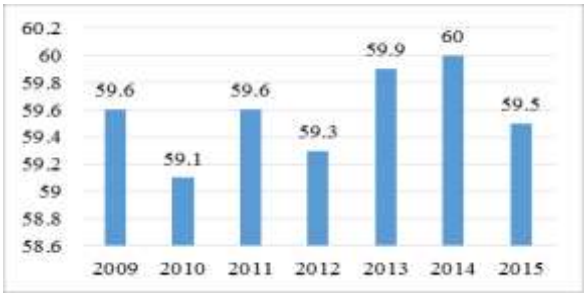

Fig. 6. The average annual percentage of lean meat recorded between 2009 and 2015 at carcasses classified by the Zwei Punkte method
Source: Own design based on the statistic data from CCC EUROP.RO, 2017 and from Classification Agencies.

CONCLUSIONS

The best quality of carcasses classified by the ZP method was recorded in 2014 with an

average of 60.0% lean meat, which is also confirmed by the separate analysis of the determined parameters. In this year, the lowest value of the thickness of the fat layer and the highest value of the thickness of the muscle was recorded.

Due to the fact that the maximum difference of the lean meat percentage determined by the Zwei Punkte manual method is only 0.9, between the minimum of 59.1% recorded in 2010 and 60.0% in the year 2014, while in the other years the differences were insignificant, it is appreciated that during the analyzed period the carcass quality has a high constancy. No special fluctuations were recorded.

Being a manual grading method by which measurements were made with the ruler between certain anatomical parts of the carcasses, there may also be an influence of the human factor. The human factor can influence the accuracy of the workmanship.

REFERENCES

[1] Causeur, D., Daumas, G., Dhorne, T., Engel, B., Font, I, Fournols, M., Hojsgaard, S., 2003, Statistical handbook for assesing pig classification methods: Recommendations from the „EUPIGCLASS" project group. EC working document.

[2]Comisia de clasificare a carcaselor de porcine, bovine si ovine din Romania, CCC EUROP, Clasificarea carcaselor de porcine in Romania, http://www.ccceurop.ro, Accessed on the 10 th of Octombre 2017.

[3]Commision Regulation (EC) Nº 3127 / 94 of 20 December 1994, Amending Regulation (EEC) Nº 2967/ 85 laying down detailed rules for the application of the Community scale for grading pig carcasses. OJ L 217 of 08.08.2006, 6-7.

[4] Commision Regulation (EEC) Nº 2967 / 85 of 24 October 1985, Laying down detailed rules for the application of the Community scale for grading pig carcasses. OJ L 285 of 25.10.1985, 39-40

[5]Council Regulation (EEC) Nº 3220 / 84 of 13 November 1984, Determining the Community scale for grading pig carcasses. OJ L 301 of 20.11.1984, 1-3.

[6]Găureanu, M., 2016, Cercetări privind uniformitatea clasificării carcaselor de porcine din România, în contextul dezvoltării sustenabile a sectorului porcin, Lucrare de disertație, Universitatea "Lucian Blaga" din Sibiu.

[7]Găureanu, M. E., Stanciu, M. A., Labă, M., 2014, Pig carcass classification in Romania: a dissection trial for the approval of the "Fat-o-Meat'er" and of the "Optigrade-Pro"equipment. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 14(4), 99-106.

[8] HYBU CIG CYMRU - Meat Promotion Wales (HCC). Carcass classification – pork, hccmpw.org.uk/market_prices/industryinformation, Accessed on the 10th of October 2017.

[9]Jaba, E., Grama, A., 2004, Statistical Analysis with SPSS under Windows.

[10]Jansons, I., Strazdina, V., Anenkova, R., Pule, D., Skadule, I., Melece, L., 2016, Development of new pig carcasses classification formulas and changes in the lean meat content in Latvian pig population, Agronomy Research 14(x), xx–xx, 9 pages, https://www.bior.lv/sites/default/files/publikacijas/L_a_230_Development%20of%20new%20pig%20carcasses%20classification.pdf, Accessed on the 3rd of September 2017

[11]Ordin MADR 839/2014 – aprobarea normelor tehnice de clasificare a carcaselor de porci, art 1 alin (2). https://legeaz.net/monitorul-oficial-394-2014/ordinul-madr-839-2014, Accessed on the 5th October 2017.

[12]Walstra, P., Merkus, G.S.M., 1996, Procedure for assessement of the lean meat percentage as a consequence of the new EU reference dissection method in pig carcass classification. Report ID-DLO 96.014.