

RESEARCH REGARDING THE EVOLUTION OF LIVESTOCK AND QUALITY OF PIG CARCASSES IN ROMANIA

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Abstract

This study is conducted for the period 2014 - 2018 with the purpose of monitoring the quantity and quality of the swine carcasses that are classified with SEUROP system in Romania. For determining the thickness of the Longissimus dorsi and the thickness of the dorsal fat there were used the equipments OptiGrade-Pro, Fat-O-Meat'er and Ruler. The data regarding the swine livestock evolution, abatorizations and classifications performed Romania came from the reports of the Commission of Carcass Classification transmit towards European Commission. Through the study it was found, for the year 2018, that the swine livestock decreased by over 500,000 heads. This decrease of the livestock is placed on the base of the occurrence and spread of African swine fever in most counties of the country. The study also highlighted some constant factors of the 5 years such as: increase of the average carcass weight from 80.6 to 84.2 kg and the quantity of lean meat in the carcass from 47.2 to 49.56 kg.

Key words: carcasses, livestock, quality, SEUROP, swine

INTRODUCTION

At this moment a worldwide commercial imbalance is taking place concerning pig meat due to spreading of African swine fever virus. The most significant losses in the world are recorded in the People's Republic of China, over one million heads of swine [8]. As an effect at the European Union level as well as in Romania, the prices of animals and meat were increased by 17 % on average at European level and 8 % at national level [10]. In year 2017 Romania imported 230,000 tons of pigs and pig meat, managing to export 4,000 tons of pigs and pig meat [13]. For swine raised with the purpose of fattening, 45 % of the production costs are produced by feeding, using basic raw materials such as corn and wheat. Thus, at national level over 50% of cereal production is exported in unprocessed form [10]. The

cumulation of these factors that occurred during the study period can have direct and indirect effects for the quantitative and qualitative production of swine carcasses obtained after slaughtering at national level [3].

MATERIAL AND METHOD

The biological material used for analysis in this study is represented by all the swine slaughtered at the level of Romania, between the years 2014 and 2018. The analysis consisted of the distribution of the carcasses by the classifiers into quality classes, according to the standard used at the European Union level called S.E.U.R.O.P.. According to the legislation in force, the necessary determinations for the classification of a carcass in the quality system S.E.U.R.O.P. is done by the Optical Probe method using 2 different equipments OptiGrade-Pro or the Fat-O-Meat'er and the Zwei-Punkt method using the equipment Rigla. The two methods are used according to the number of animals classified in the

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previous year. Thus, for slaughterhouses exceeding 200 swine slaughtered per week, the Optical method is applied, and for those with a smaller number of swine the Zwei-Punkt method [6].

The Optical Probe method involves the use of precision semi-automatic equipments. The determinations with the two equipments (fig. 1) are made on the left half carcass in a predetermined place. The rod should be positioned at an angle of 90° and inserted 7 cm from the midline between ribs 3 and 4, counting from the dorsal to the front [14].

In the study the following factors are considered the number of animals slaughtered per year, the method of classification and the results obtained for each class, the weight of the warm carcass and the percentage of lean meat and fat. The data underlying this study is published by the Carcass Classification Commission but also transmitted to the European Commission and results from the weekly reports of the persons

who have been authorized, they can be independent classifiers or a part of Classification Agencies [11].

As a method of data analysis, the information is compared with literature review as well as basic methods for statistical analysis.

RESULTS AND DISCUSSIONS

The study carried out takes into account the qualitative and quantitative evolution of the carcasses that were classified in the slaughterhouses in Romania during the years 2014 - 2018. In this period the swine population is in a continuous decrease reaching a difference of 1,317,836 heads, but the number of classified carcasses had an upward trend. An annual decrease of the livestock with over 100,000 heads is observed, which in 2018 (tab. 1) is amplified by the slaughter of over 350,000 swine after the appearance of African swine fever [7].

Table 1 Swine livestock from Romania and the number of the classified carcasses

Year of reference / category	2014	2015	2016	2017	2018
* Swine livestock (head)	5.180.173	5.041.788	4.926.928	4.707.700	4.129.293
*** The difference of swine livestock compared to 2018	+ 25.44 %	+ 22.09 %	+ 19.31 %	+ 14 %	0 %
** Number of swine carcasses classified (carcasses)	3.920.767	4.086.643	4.392.903	4.345.551	4.274.222
*** The difference of classified swine carcasses compared to 2018	- 8.26 %	- 4.38 %	+ 2.77 %	+ 1.66 %	0 %
*** Classified swine carcasses from swine livestock (carcasses)	75.68 %	81.05 %	89.16 %	92.3 %	103.5 %

Source: * National Institute of Statistics, ** Carcass Classification Commission, *** Own calculations

The number of classified carcasses had an increasing trend in the first 3 years, with the highest production in 2016, following a slight depreciation for the next 2 years (tab. 1). The classified carcasses, out of the total number of swine, represented an increasing weight during the 5 years. The swine slaughtered in 2018 exceed the number of swine from national livestock which resulted also due to animal imports (tab. 1). Only from European Union, in 2018, were introduced into the country 216,353 heads swine with slaughtering purpose [12].

Table 2 highlights the methods and equipment used in slaughterhouses at the national level, these being regulated by law. Mostly, the classification is done with the equipment based on the Optical Probe method, which is used in approximately 95 % of the cases, having as an advantage the speed and accuracy of making determinations.

The classifiers tend to use the OptiGrade-Pro equipment [2], in 2018 being used in over 74 % of the classifications. The use of Fat-O-Meat'er equipment varies so that in 2018, it gets to be used at 20 % of the classifications achieved.

Table 2 Methods used in carcass classification

Reference year / Number of classified carcasses by each method and equipment	Optical Probe				Zwei-Punkt	
	OptiGrade-Pro		Fat-O-Meat'er		Ruler	
	Total number of carcasses	Total percentage of classified carcasses	Total number of carcasses	Total percentage of classified carcasses	Total number of carcasses	Total percentage of classified carcasses
2014	2.108.716	53,78%	1.578.823	40,27%	233.228	5,95%
2015	2.208.367	54,04%	1.702.433	41,66%	175.843	4,30%
2016	2.340.268	53,27%	1.847.441	42,06%	205.194	4,67%
2017	2.170.808	49,95%	1.999.727	46,02%	175.016	4,03%
2018	3.203.750	74,96%	873.519	20,44%	196.953	4,61 %

Source: Carcass Classification Commission

These variations in the use of the two equipments using the Optical Probe may be caused by the difference of the characteristics such as the lack of partial mobility to the Fat-O-Meat'er equipment being connected by a wire during the determinations unlike the OptiGrade-Pro equipment which is completely mobile. The Ruler is a much less used equipment with disadvantages such as the longer execution time of the determinations as well as obtaining values with a higher margin of error [1]. The use of

the Ruler is made only in the slaughterhouses that did not exceed 200 swine slaughtered per week for the previous year, but also in the event of malfunctions in the equipments that are using the Optical Probe, it can be used 30 days from the moment of the detection [6]. The annual average of the values obtained from the determinations with the 2 types of equipment shows minor variations (fig. 1) [4] considering that at Fat-O-Meat'er we have an admitted tolerance of ± 1 mm and at OptiGrade - Pro ± 0.5 mm [14].

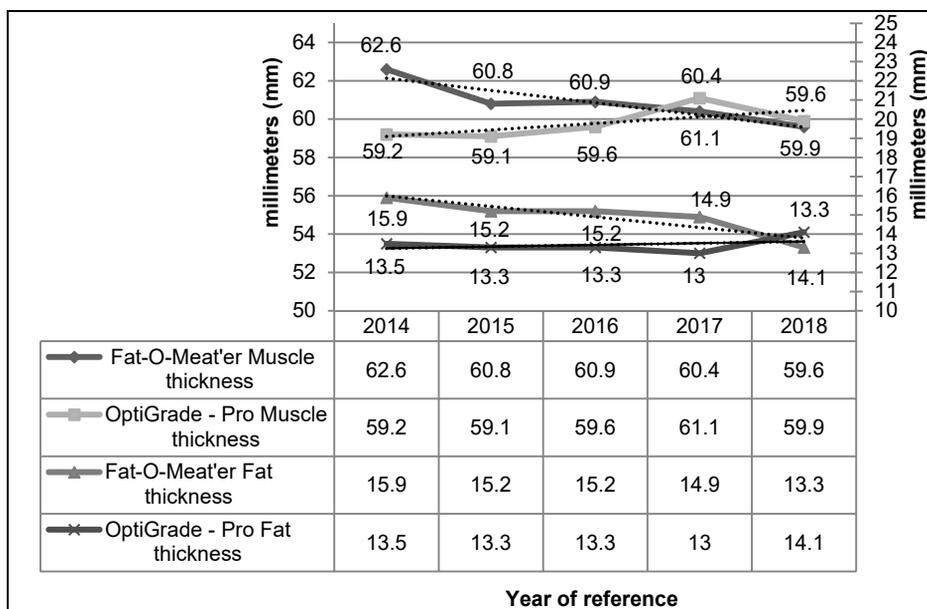


Fig. 1 Determination of the thickness of the muscle and the fat using the Fat-O-Meat'er and OptiGrade-Pro equipments, after which the carcasses were classified at national level
Source: Carcass Classification Commission

In both the thickness of the muscle and the thickness of the fat, the average of the values per year are higher for the determinations made with the Fat-O-Meat'er equipment, but this equipment has a tolerance greater than 0.5 mm [14]. that of OptiGrade - Pro equipment (fig. 1).

The classifications made with the Fat-O-Meat'er equipment have had an increasing tendency regarding the accuracy of lean meat percentage found in the carcass, exceeding 60 % in the last 4 years analyzed (fig. 2), therefore that most carcasses are classified in the S class quality, according to S.E.U.R.O.P. standard [6].

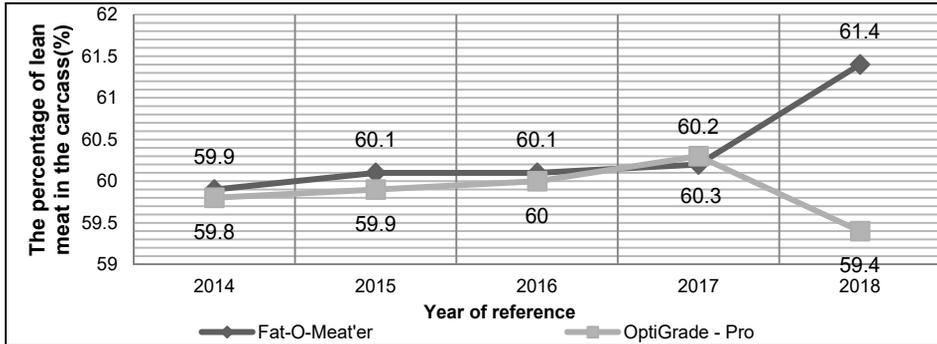


Fig. 2 Determinations of the percentage of lean meat using Fat-O-Meat'er and OptiGrade-Pro equipments after which the carcasses were classified at national level
Source: Carcass Classification Commission

For the classifications where OptiGrade - Pro equipment is used, we note that, in general, the values were slightly lower than those for which the Fat-O-Meat'er is used. The difference between the values obtained from the determinations with the 2 equipments can come from the difference of the slaughtered animals (fig. 2) as well as the tolerated admissibility [14].

During the 5 years that we analyse, the average weight of the carcass has evolved constantly with approximately 920 g per year, accumulating an increase of approx. 3.6 kg. An aspect observed and shown in fig. 3 is the increase of lean meat, this being on average 592 g per year, reaching an increase of approx. 2.36 kg for the 5 years analyzed.

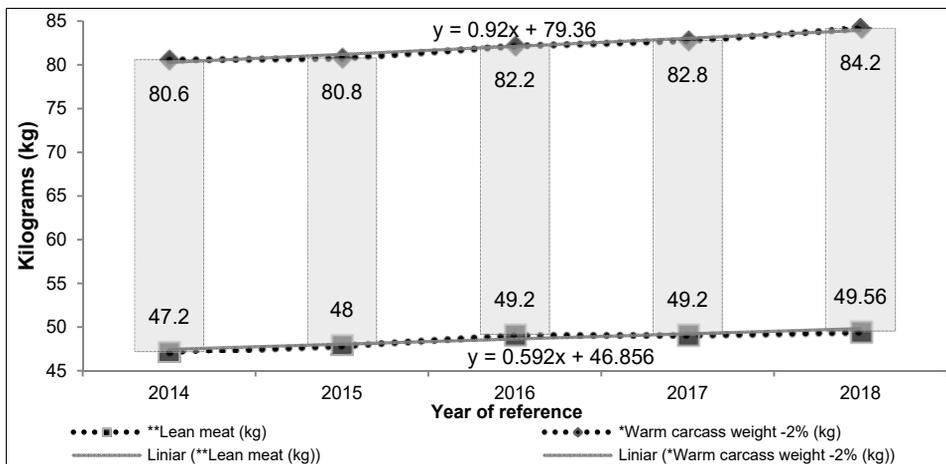


Fig. 3 Evolution of average weight in carcasses and lean meat
Source: * Carcass Classification Commission, ** Own calculations

Taking into account that the weight of lean meat is an integral part of the weight of the carcass, we can say that 64 % of the weight gained is based on the increase in the weight of lean meat, which indicates a positive evolution both quantitative and qualitative (fig. 3) [5]. The highest weight of lean meat in relation to the average weight of the carcasses

was found in 2017 with a percentage of 60.2 %, but the minimum value reached in 2014 and 2018 was 59.8 % (fig. 3).

After slaughter, the carcass weight has values between 49 and 117 kilograms, but mainly the carcasses have values in the range 75 to 85 kilograms (fig. 4).

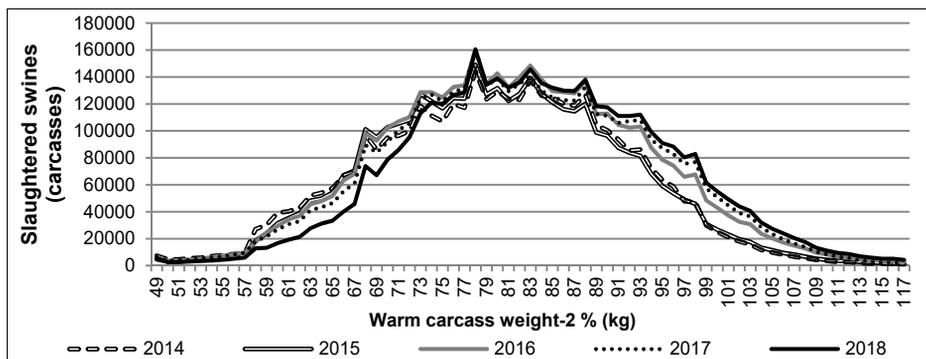


Fig. 4 Graphical representation of the number of swine slaughtered by weight categories
Source: Carcass Classification Commission

According to fig. 3 through which the evolution of the average weight of the carcass is represented, as well as of fig. 4 we can see the value distribution of the weight, noting that this increase took place through the translation of the carcasses with maximal values, from small to large. The upper average of the number of carcasses according to the weight it is placed between 78 and 79 kilograms (fig. 4).

The data presentation in fig. 5 has the role of highlighting the production of carcasses according to the quality class. During the study period, the quality S is significantly delimited, with an increasing number of carcasses, until 2017 having 58.43 % of the total classifications made in that year. Although 2016 is the year with the largest production of carcasses, being 1.08 % higher than in 2017 (tab. 1), the number to which they are assigned the S quality is lower by approx. 4.76 %.

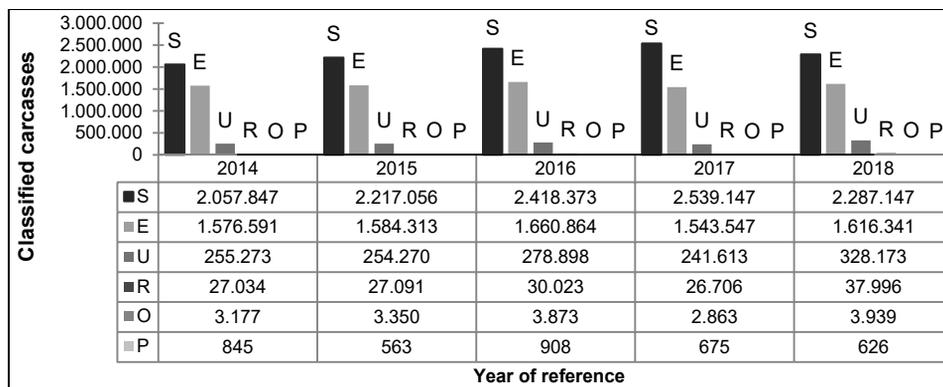


Fig. 5 Representation of the number of classified carcasses for each quality class
Source: Carcass Classification Commission



In the year 2018, a quantitative (tab. 1) as well as qualitative impairment of the swine carcasses is observed, a fact that is noticeable in fig. 5.

The decrease in the number of swine in Romania by 14%, in a single year (tab. 1), due to the sacrifices of over 350,000 thousand heads, on account of the infection with the African swine fever virus [7], also acted on the decrease of the number of swine carcasses with S quality.

CONCLUSIONS

The analysis showed a decrease of the swine population in Romania, more significant in 2018, due to the African swine fever, which caused a deficit of the need for animals for slaughter, resulting in an increase in imports of swine, for slaughter.

During the study period, the average lean meat content was increased by 2.36 kg and the carcass weight by 3.6 kg but a decrease in the percentage of fat, resulting in a higher share of carcasses to which they were assigned the S grade.

Considering the imports of animals, in order to slaughter to cover the deficit of pork meat at national level, associated with the export of raw material used in producing feed, all this has led to the rise of the price of pig meat nationally and worldwide.

Thus, we consider that it is a real necessity to stimulate the zootechnical sector in terms of reproduction, growth, and fattening of swine.

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