The effect of transition from EUROP 5-point scale to 15-point scale beef carcass classification on carcass distribution of young slaughtered bulls in Slovenia

Žgur, S., Čepon, M.

Poljoprivreda/Agriculture

ISSN: 1848-8080 (Online)
ISSN: 1330-7142 (Print)

http://dx.doi.org/10.18047/poljo.21.1.sup.49

Poljoprivredni fakultet u Osijeku, Poljoprivredni institut Osijek

Faculty of Agriculture in Osijek, Agricultural Institute Osijek

ISSN 1330-7142
UDK: 636.2
DOI: 10.18047/poljo.21.1.sup.49

THE EFFECT OF TRANSITION FROM EUROP 5-POINT SCALE TO 15-POINT SCALE BEEF CARCASS CLASSIFICATION ON CARCASS DISTRIBUTION OF YOUNG SLAUGHTERED BULLS IN SLOVENIA

Žgur, S., Čepon, M.

Preliminary communication

SUMMARY

In 2007, the EUROP 15-point scale of carcass conformation and fatness classification system was introduced in Slovenia and replaced existing 5-point scale. Data (carcass weight, carcass conformation and fatness) from Slovenian commercial slaughterhouses were collected from January 2005 to December 2013. In total, data from 374,122 animals were used. The analysis was conducted for the category of young bulls from 12 to less than 24 months of age. In the first year after the transition, the classifiers preferentially used $_0$ classes in classification of carcass conformation and carcass fatness as well. In period 2008 - 2009 the classifiers adapted the new scale and started to use + and – subclasses more frequently. The distribution of conformation and fatness subclasses was brought near normal distribution.

Key-words: EUROP-carcass classification, distribution, young bulls, Slovenia

INTRODUCTION

Meat production and especially beef production is an important part of agricultural production in Slovenia. Around 18% of total value of purchased agricultural products in 2012 represented slaughtered calves and cattle (SURS, 2013). The main aim of the carcass classification and grading is to describe the carcass using standard terms to facilitate trading (Polkinghorne and Thompson, 2010). Carcass conformation and fatness are the traits used in EUROP classification system and thus the most important traits affecting the achieved price and the income of the producers. In the EU countries the five main classes with suitable subdivisions in subclasses were accepted as adequate to describe the very variable cattle population (Fisher, 2007). The Slovenian regulation first introduced EUROP carcass classification in 1994 and foresaw 5-point scale of conformation and fatness classification (Rules…, 1994). In 2005, the regulation was changed so that in 2007 the 15-point scale was introduced with further discriminate carcass prices due to differences in conformation and fatness. Furthermore, carcass subclasses were introduced (Rules…, 2005). 15-point scale should encourage all the participants to use traits, like weight, conformation and fatness score in genetic evaluation of cattle according to ICAR recommendation (ICAR, 2014). On the other hand, beef carcass classification is subjective and the individual classifiers had to adapt to those change. Measures were undertaken to encourage them to use also subclasses. The main objective of the our work was to find out how this transition affected classification results of slaughtered young bulls, representing the most important category of slaughtered cattle in the Slovenian slaughterhouses.

MATERIAL AND METHODS

Data from young bulls from 12 to less than 24 months of age were collected in commercial slaughterhouses in Slovenia from January 2005 to December 2013. The carcass weight was defined within 45 min after the slaughter. The conformation and fatness were estimated by independent classifiers according to the EUROP classification system with subclasses. Conformation classes expressed with letters were transformed to the numbers (E+ = 15, E_0 =14,…, P- = 1)

Prof. Dr. Silvester Žgur (silvo.zgur@bf.uni-lj.si), M.Sc. Marko Čepon (marko.cepon@bf.uni-lj.si) - University of Ljubljana, Biotechnical Faculty, Animal Science Department, Groblje 3, Domžale, Slovenia

and fatness classes as follows 1- = 1, 1_0 = 2, 1+ = 3,..., 5+ = 15. Data of total 374,122 animals were processed into statistical analysis. UNIVARIATE procedure in SAS statistical package (SAS, 2001) was used to test the normal distribution for each year.

RESULTS AND DISCUSSION

The number of graded carcasses from young bulls increased from 2005 to 2007 and decreased after that (Table 1). Carcass weight significantly increased from 345 to 354 kg in the first three years and then to 359 kg in the 2013. Together with mean carcass weight, variability also increased. Carcass conformation was relatively stable, with slight increasing trend in the last years. Similar results can be noted on the basis of 5-point as well as 15-point scale. On the contrary, carcass fatness slightly decreased in the last years. In Austria in the same period from 2007 to 2013, the average carcass conformation was relatively constant and varied from 3.44 to 3.51 (Daten and Fakten, 2015). Variability of carcass conformation and fatness as well remained constant during all the studied years. The average coefficient of variation was around 25% for carcass conformation and fatness as well. The transition from 5-point scale to 15-point scale had no effect on the average carcass conformation and fatness score.

Table 1. The number of graded carcasses of young bulls and the average carcass weight, conformation and fatness score in different years

Year of slaughter	N	Carcass weight, kg		EUROP conformation, 1-5		EUROP fatness, 1-5		EUROP conformation, 1-15		EUROP fatness, 1-15	
		mean	std	mean	std	mean	std	mean	std	mean	std
2005	40302	345.41	59.27	3.00	0.73	2.66	0.56				
2006	45001	342.65	59.31	2.95	0.73	2.66	0.54				
2007	49037	354.21	60.47	3.01	0.72	2.56	0.58	7.94	2.09	6.72	1.67
2008	46302	353.77	61.98	3.03	0.74	2.48	0.57	7.99	2.14	6.50	1.62
2009	41113	354.63	62.81	3.05	0.74	2.50	0.62	8.04	2.14	6.54	1.78
2010	39939	358.22	64.12	3.06	0.74	2.53	0.61	8.06	2.15	6.63	1.76
2011	42105	356.51	63.15	3.03	0.73	2.50	0.59	8.00	2.13	6.52	1.65
2012	37259	358.62	65.79	3.06	0.73	2.46	0.57	8.10	2.13	6.39	1.60
2013	33064	359.14	68.32	3.12	0.73	2.41	0.58	8.27	2.09	6.25	1.65

The distribution of slaughtered young bulls into different conformation and fatness subclasses is shown in Table 2. In 2007 the proportion of graded carcass into classes P_0, O_0, $R_{0,.}$ U_0 and E_0 was higher than expected, whereas the proportion in + and – subclasses was lower. This points to the fact that classifiers preferentially used $_0$ classes. As early as the next year 2008 and further in 2009, the classifiers adapted to the new scale and started to use + and – subclasses more frequently. For example, if we look at the most representative subclass R_0, we can see that in the year 2007 there are 31.12% carcasses graded into those subclass, whereas in 2008 26.22% and 2009 only 23.21%. On the other side, the percentage of carcasses graded into R- and R+ increased by 3.59 and 1.33%. The same is true also for carcass fatness. In 2007, 37.55% of carcasses were graded into class 3_0. In the following year, these percentages declined to 25.92 and in 2009 further to 21.78%. On the other side, the percentage of carcasses graded in + in – class increased by 4.46% and 3.25%, respectively.

The alteration of distribution of slaughtered young bulls into different conformation and fatness subclasses through the studied years is clearly visible in Figure 1 and 2. Most of the changes occurred in the first three years after the introduction of 15-point scale for carcass conformation and fatness.

Table 2. The distribution of slaughtered young bulls into different conformation and fatness subclasses in different years (%)

			Year of slaughter						
			2007	2008	2009	2010	2011	2012	2013
EUROP-conformation, 1-15	P-	1	0.11	0.06	0.06	0.08	0.07	0.08	0.05
	P_0	2	1.07	0.77	0.67	0.70	0.71	0.51	0.45
	P+	3	0.50	0.71	0.69	0.76	0.86	0.70	0.85
	O-	4	3.15	3.86	4.36	4.01	4.42	3.97	3.45
	O_0	5	11.18	9.72	8.11	7.75	7.01	6.95	5.86
	O+	6	5.11	6.29	6.85	7.03	7.85	7.38	6.61
	R-	7	13.74	15.94	17.33	17.85	17.13	17.1	15.23
	R_0	8	31.12	26.22	23.21	23.02	25.2	24.53	22.99
	R+	9	10.76	11.27	12.19	11.93	12.58	13.25	16.11
	U-	10	9.57	11.07	13.00	12.86	10.14	10.61	14.24
	U_0	11	11.57	10.58	9.16	9.66	9.95	10.29	9.60
	U+	12	1.44	2.51	3.32	3.14	3.06	3.07	2.78
	E-	13	0.43	0.71	0.81	0.92	0.74	1.06	1.30
	E_0	14	0.25	0.29	0.23	0.27	0.27	0.39	0.46
	E+	15	0.00	0.00	0.01	0.02	0.01	0.11	0.02
EUROP-fatness, 1-15	1-	1	0.06	0.03	0.01	0.03	0.03	0.02	0.07
	1_0	2	1.34	0.82	1.94	1.67	0.84	0.71	0.66
	1+	3	1.06	1.04	1.37	1.26	1.29	1.07	1.32
	2-	4	3.65	5.21	6.89	5.73	6.69	7.16	10.26
	2_0	5	25.17	26.95	21.3	20.51	21.92	25.04	24.51
	2+	6	11.95	17.65	18.58	18.55	19.89	20.82	22.54
	3-	7	11.47	13.98	15.93	17.09	18.22	17.88	16.68
	3_0	8	37.55	25.92	21.78	22.29	21.06	18.41	15.3
	3+	9	5.61	6.34	9.13	9.58	7.52	6.79	6.18
	4-	10	1.11	1.21	1.54	1.59	1.4	1.2	1.25
	4_0	11	0.87	0.66	1.18	1.31	0.87	0.7	0.94
	4+	12	0.12	0.16	0.25	0.3	0.24	0.18	0.24
	5-	13	0.02	0.03	0.06	0.06	0.02	0.02	0.05
	5_0	14	0.02	0.00	0.04	0.02	0.01	0.01	0.00
	5+	15	0.00	0.00	0.00	0.01	0.00	0.00	0.00

In Table 3, the negative values of skewness for conformation in all the years indicate that the curve is always skewed left, so the tail on the left side of the probability density function is fatter. There is no such rule for fatness. The values of kurtosis near zero indicate a mesokurtic curve type. The presented p-values for Kolmogorov-Smirnov D-values were lower than 0.05 for all the studied years and pointed to non-normal distribution.

Table 3. Some basic measurements from normal distribution testing for carcass conformation and fatness of slaughtered young bulls in different years

Year of slaughter	EUROP conformation, 1-15				EUROP fatness, 1-15			
	Skewness	Kurtosis	Kolmogorov-Smirnov D-value	P-value for D	Skewness	Kurtosis	Kolmogorov-Smirnov D-value	P-value for D
2007	-0.2324	0.0237	0.1624	<0.0100	-0.2747	-0.1488	0.2312	<0.0100
2008	-0.1386	-0.1438	0.1335	<0.0100	0.0860	-0.2545	0.1649	<0.0100
2009	-0.1456	-0.1727	0.1198	<0.0100	0.01227	0.0170	0.1335	<0.0100
2010	-0.1385	-0.1150	0.1227	<0.0100	-0.0027	0.0912	0.1336	<0.0100
2011	-0.1261	-0.0454	0.1321	<0.0100	0.1053	-0.0455	0.1300	<0.0100
2012	-0.0566	0.0151	0.1316	<0.0100	0.2340	-0.0233	0.1470	<0.0100
2013	-0.2038	0.1049	0.1240	<0.0100	0.3882	0.1784	0.1548	<0.0100

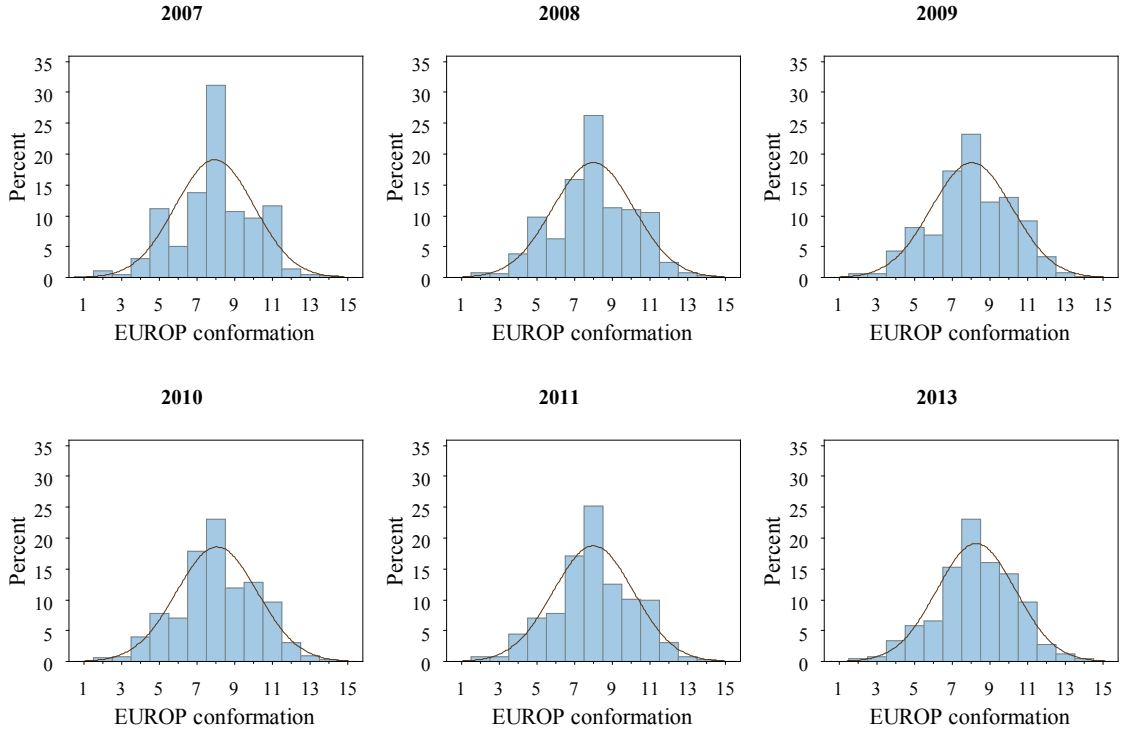

Figure 1. The distribution of slaughtered young bulls into different conformation classes in different years

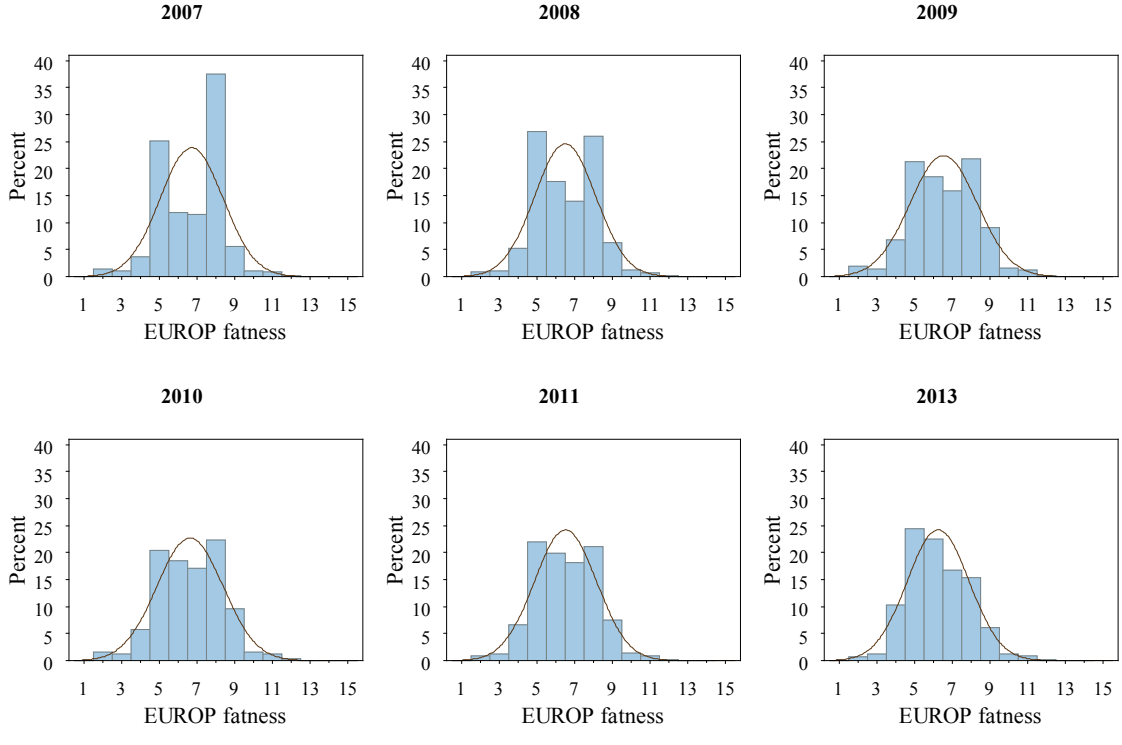

Figure 2. The distribution of slaughtered young bulls into different fatness classes in different years

CONCLUSION

The conducted analysis demonstrated that beef carcass classifiers successfully passed from 5-point to 15-point scale of carcass conformation and fatness classification. The carcass distribution into different conformation and fatness subclasses was brought near normal distribution. Carcass classification into subclasses enables expression of variability inside each class. This provides better quality of raw data for genetic evaluation and a basis for more effective genetic improvement.

REFERENCES

1. Daten und Fakten der AgrarMarkt Austria für den Bereich Vieh und Fleisch (2015): Home page address: http://www.ama.at/Portal.Node/ama/public?gentics.rm=PCP&gentics.pm=gti_full&p.contentid=10008.200840&260_Klassifiz_2014.pdf. (30.3.2015).
2. Fisher, A. (2007): Beef carcass classification in the EU: an historical perspective. In: C. Lazzaroni, S. Gigli, D. Gabiña (ed.) Evaluation of Carcass and Meat Quality in Cattle and Sheep. EAAP Publ. N. 123, Wageningen Academic Pub. Wageningen, Netherlands, pp. 19-30.
3. ICAR Recording Guidelines (2014): Home page address: http://www.icar.org/Documents/Rules%20and%20regulations/Guidelines/Guidelines_2014.pdf. (30.3.2015).
4. Rules on assessment and classification of carcasses and half-carcasses of adult bovine animals on the slaughtering line (1994): Uradni list RS, 28/94: 1831-1834.
5. Rules on implementation of Councile Regulation (EEC) and Commission Regulation (EEC) on the assessment of beef carcesses (2005): Uradni list RS, 120/2005: 13769-13771.
6. SAS. (2001): User's Guide: Statistics, Version 6. SAS Institute Inc., Cary, NC, USA.
7. SURS (2013): Statistični letopis 2013, Statistični urad Republike Slovenije, Ljubljana, Slovenia.
8. Polkinghorne, R.J., Thompson, J.M. (2010): Meat standards and grading: A world view. Meat Science, 86(1): 227–235.
doi: http://dx.doi.org/10.1016/j.meatsci.2010.05.010

(Received on 30 April 2015; accepted on 9 July 2015)