

## CARCASS QUALITY OF AUTOCHTHONOUS CIKA CATTLE

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Received October 20, 2008, accepted November 11, 2008.

Delo je prispelo 20. oktobra 2008, sprejeto 11. novembra 2008.

### ABSTRACT

The Cika cattle is the only Slovenian autochthonous cattle breed, counting around 1,600 animals in 2007.. The breeding goal for Cika cattle is dual purpose with the emphasis on milk production. However, Cika cattle is mostly reared in the cow-calf system. To a smaller extent Cika cattle is still used for milk production in the traditional regions for Alpine dairy-farming. Our main interest was to get an insight into carcass quality of Cika cattle. The data used in this survey were collected in slaughterhouses in the years 2005 through 2007. Out of all slaughtered cattle in 2007 the share of slaughtered Cika cattle was 0.24%. According to the category, the slaughtered animals were very heterogenic in carcass weight which is seen in rather large standard deviations. The average carcass weight of A category (bulls under 24 months of age) was 260.3 kg. The majority of bulls under 24 months of age and calves were classified in conformation class O (57.1 and 47.8%), whereas bulls over 24 months of age were mostly classified in the conformation class R. The majority of calves (88.1%), bulls under 24 months of age (55.8%) and bulls over 24 months of age (49.5%) were classified in fatness class 2. Most of Cika cattle are reared extensively on small farms, mostly on mountain pastures without any additional concentrates. This could present the basis and the opportunity for Cika breeders to promote beef from Cika cattle on the market and to increase their income. Autochthonous Cika is well adapted to the environment and helps to maintain biodiversity and sustainable agricultural production, especially in less favourable agricultural areas.

Key words: cattle / autochthonous breeds / Cika / carcass quality / Slovenia

## KLAVNA KAKOVOST AVTOHTONEGA CIKASTEGA GOVEDA

### IZVLEČEK

Cika je edina avtohtona pasma govedi v Sloveniji, katere populacija je v letu 2007 štela okoli 1600 živali. Rejski cilj za cikasto govedo je kombinirana usmeritev s poudarkom na prireji mleka. Kljub temu, cikasto govedo redijo v večini primerov v sistemu krava-tele. V manjši meri pa pasmo še vedno uporabljajo za prirejo mleka v tradicionalnih regijah za planšarstvo. Glavni namen raziskave je bil dobiti vpogled v klavno kakovost cikastega goveda, kakor je bila ovrednotena na klavni liniji. Podatki uporabljeni v raziskavi so bili zbrani v klavnicah v letih od 2005 do 2007. Cikasto govedo je v letu 2007 predstavljalo le 0,24 % vsega zaklanega goveda v Sloveniji. Zaklano govedo po kategorijah je bilo zelo heterogeno (raznoliko) v masi klavnih polovic, kar je vidno v precej velikih standardnih odklonih. Povprečna masa klavnega trupa kategorije A (biki do starosti 24 mesecev) je bila 260,3 kg. Večina bikov starih do 24 mesecev in telet je bila razvrščena v O razred za mesnatost (57,1 % in 47,8 %), medtem ko so bili biki starejši od 24 mesecev večinoma razvrščeni v R razred za mesnatost. Večina telet (88,1 %), bikov starih do 24 mesecev (55,8 %) in bikov starih nad 24 mesecev (49,5 %) je bilo razvrščeno

v razred 2 za zamaščenost. Cikasto govedo večinoma redijo ekstenzivno na majhnih kmetijah, pogosto na planinskih pašnikih brez dodajanja močnih krmil. To bi lahko bila priložnost za rejce cikastega goveda za promocijo govedine cikaste pasme na tržišču z namenom povečanja dohodka. Avtohtona cika je zelo prilagojena na okolje in pomaga ohraniti biodiverzitetu in sonaravno kmetijsko proizvodnjo, še posebno na marginalnih območjih.

Ključne besede: govedo / avtohtone pasme / cika / klavna kakovost / Slovenija

## INTRODUCTION

The Cika cattle is the only Slovenian autochthonous cattle breed which has been preserved to the present days. In the second half of the 19th century, Cika cattle arose from the improving light-red, red or brown-red coloured Bohinj cattle with sires from Möelthal and Pinzgau (Austrian provinces). The population of Cika is very heterogeneous despite the increasing number of animals. The reason for phenotypic variability of population is the semen of Pinzgauer sires used for artificial insemination of Cika cows due to the agricultural - political decision after Second World War. In 2007, the population of Cika cattle is numbering 1625 animals (Sector for Identification and Registration at the Ministry for Agriculture, Forests and Food). Unfortunately in real autochthonous and original phenotype there are only about 20% of all Cika cattle, which totals around 300 animals.

Breeding goal for Cika cattle is dual purpose breed with the emphasis on milk production. However, Cika cattle is mostly reared in the cow-calf system. Suckler herds are kept for beef production only, which is not in accordance with the breeding goal. However, Cika cattle is to a smaller extent still used for milk production in traditional regions of Alpine dairy-farming, especially on Bohinj and Kamnik mountain pastures. Some breeders from those two regions have preserved traditional way of rearing this cattle breed. During the vegetation period, herds are moved from lowland farms to mountain pastures. The herds of Cika cows grazed on Alpine mountain pastures, where Alpine dairying and milk processing into products like cheese, cottage cheese, fresh butter and sour milk has been preserved. Alpine dairymen sell processed milk products to the mountaineers and to tourists visiting the mountains. The income from sold milk products nowadays represents an additional financial source, which was in the past the main income. However milk products, especially cheese from Cika milk made in the mountains represented the only source for the survival of the lowland farm in the winter time.

As mentioned previously, Cika herds are nowadays reared mostly as suckler herds for beef production. The aim of our work was to get an insight into carcass quality of slaughtered Cika cattle in Slovenia in the last three years.

## MATERIAL AND METHODS

The data used in this survey were collected in slaughterhouses between 2005 to 2007. Slaughtered Cika cattle were reared on Slovenian small farms using the traditional production system. In the cold months of the year, voluminous forage was used and during the vegetation period cattle were put on the pasture. Hay, silage and small amount of concentrates were used in the winter time. High percentage of slaughtered Cika cattle originated from ecological farms, where rearing technology is very extensive. After the slaughter, carcass weight was recorded and carcass conformation and fatness were scored according to the EUROP system (Pravilnik o izvajanju..., 2005). The net daily gain was calculated on the basis of carcass weight and age at slaughter.

## RESULTS AND DISCUSSION

In Table 1 the number of slaughtered Cika cattle is presented for years 2005 to 2007. Out of the total slaughtered cattle in the year 2007 in Slovenia the share of slaughtered Cika was 0.24% (Žgur *et al.*, 2008). With the growing population of Cika cattle, the number of slaughtered Cika cattle has increased in the last three years from 145 to 287 animals. Especially the number of slaughtered Cika bulls under 24 months of age significantly increased in the last three years. The number of slaughtered Cika bulls over 24 months of age represented very extensive fattened bulls and culled sires for natural mating on farms. In the last few years a small number of Cika breeders have decided to rear steers, because steer's meat is believed to be more juicy and tasteful. Steers can graze in the herds together with other cows, calves and sire, which is very suitable for breeders. Usually, they reared steers just for self-supply on the farm. The number of culled cows above 5 years of age is higher than the number of culled cows under 5 years of age at slaughter. The number of slaughtered heifers is relatively low and we think that most of them were those born like twins together with a male calf or heifers with fertility disorders. In endangered population it is not advisable to slaughter calves, yet the number of slaughtered calves was relatively high. In the year 2005, 20.7%, in the year 2006, 12.2% and in the year 2007, 16.0% of slaughtered Cika cattle were calves. On the other hand, a calf is a by-product in the traditional milk production system with Cika cows. In the region of Bohinj, where the Alpine-dairy farming has still been preserved, the number of slaughtered calves proved to be higher. At the beginning of vegetation the cows are moved to the mountain pastures without calves, because the farmers need milk for cheese production. But nevertheless, female calves with well expressed autochthonous breed characteristics should not be slaughtered despite the traditional production system.

Table 1. The number of slaughtered Cika cattle from 2005 to 2007  
Preglednica 1. Število zaklanega cikastega goveda od 2005 do 2007

Category of cattle Kategorija govedi		Year of slaughter / Leto zakola		
		2005	2006	2007
A	Bulls under 24 months Biki stari do 24 mesecev	38	97	117
B	Bulls over 24 months Biki starejši od 24 mesecev	37	38	48
C	Steers Voli	5	6	6
D1	Cows under 5 years Krave stare do 5 let	9	14	14
D2	Cows over 5 years Krave starejše od 5 let	16	25	32
E	Heifers Telice	10	7	24
T	Calves Teleta	30	26	46
Total Skupaj		145	213	287

Carcass weights for all Cika cattle categories are shown in the Table 2. Great variability of Cika cattle is seen also in the large variability of carcass weight, which reflects in rather large standard deviations. The average carcass weight of bulls in A category (bulls under 24 months of age) was 260.3 kg at average 18.6 months of age. The lightest carcass weight was 104.0 kg and the heaviest carcass weight was 450.0 kg. The autochthonous phenotype of Cika cattle is lighter than Cika cattle improved with the Pinzgauer sires after Second World War. On the other hand, Cika cattle has the brachycerous origin, suitable for milk production, with low body weight and small frame. The differences in cows' linear body measurements (withers height, chest girth, width of chest, depth of chest) and their proportions of original and improved phenotype of Cika cattle have already identified (Kastelic *et al.* 2005).

Bulls reared to the age of more than 24 months (B category) were in average heavier (322.0 kg), and of course much older (30.3 months) but had lower net daily gain compared to bulls in A category. The lightest "B category" carcass weighed 166.8 kg and the heaviest 582.6 kg. Carcass weight of slaughtered steers was 247.2 kg, which was similar to the bulls in A category. But steers were much older at slaughtered than bulls in category A, and so they achieved lower net daily gain. Carcass weight of cows under 5 years had in average 235.6 kg, while carcass weight of cows over 5 years of age at slaughter weighed 257.5 kg. Average carcass weight of heifers was very low (193.9 kg). It would be better if breeders fattened heifers to higher weight at slaughter. The average carcass weight of calves was 91.3 kg at 4.6 months of age at slaughter.

Table 2. Carcass weight, net daily gain and age at slaughter for all categories of slaughtered Cika cattle in the years from 2005 to 2007

Preglednica 2. Masa klavnih polovic, dnevni neto prirast in starost ob zakolu za vse kategorije zaklanih govedi cikaste pasme v letih od 2005 do 2007

Category of cattle Kategorija govedi	n	Average carcass weight Povprečna masa klavnega trupa ± SD, kg	Average net daily gain, g/days Povprečen dnevni neto prirast ± SD, g/dan	Average age, months Povprečna starost ± SD, meseci
A Bulls under 24 months Biki stari do 24 mesecev	249	260.3 ± 73.2	474.3 ± 96.8	18.6 ± 4.7
B Bulls over 24 months Biki starejši od 24 mesecev	123	322.0 ± 58.6	364.5 ± 83.6	30.3 ± 6.6
C Steers Voli	17	247.2 ± 71.2	328.4 ± 73.1	26.9 ± 14.3
D1 Cows under 5 years Krave stare do 5 let	34	235.6 ± 48.6	-	42.9 ± 8.5
D2 Cows over 5 years Krave starejše od 5 let	72	257.5 ± 55.5	-	106.1 ± 32.5
E Heifers Telice	41	193.9 ± 45.1	306.0 ± 78.0	22.2 ± 5.9
T Calves Teleta	102	91.3 ± 28.7	706.6 ± 176.0	4.5 ± 1.7

SD = standard deviation

Gil *et al.* (2001) reported carcass weight (Table 3) of low meat Spanish rustic cattle breeds, two breeds with small to medium size frame (Asturiana de la Montana, Morucha) and one medium sized frame breed (Avileña – Negra Ibérica). Cika bulls of A category had similar carcass weight as Morucha bulls, but the difference existed in age at slaughter. Cika bulls needed

almost four months longer fattening period to achieve the same carcass weight. On the other hand, Asturiana de la Montaña bulls needed 541 days to reach 249.9 kg carcass weight and had similar net daily gain (461.9 g/day) as Cika bulls (473.2 g/day). Avileña – Negra Ibérica had the highest net daily gain and the heaviest carcass weight compared to all breeds shown in the Table 3.

Table 3. Carcass weight and age at slaughter of three Spanish rustic breeds (Gil *et al.*, 2001) and of Cika cattle

Preglednica 3. Masa klavnega trupa in starost ob zakolu treh starih španskih pasem govedi (Gil *et al.*, 2001) in cikastega goveda

Spanish rustic breed Španske stare pasme	Asturiana de la Montaña	Morucha	Avileña–Negra Ibérica	Cika cattle (our study)
Carcass weight				
Masa klavnih polovic, kg	249.9	259.9	279.4	260.3
Age at slaughter, days				
Starost ob zakolu, dni	541.0	438.9	363.3	556.8
Net daily gain, g/days				
Dnevni neto prirast, g/dan	461.9	592.2	769.1	474.3

Petrič (2008) found higher carcass weight and net daily gain in similar study including other dual purpose and beef cattle breeds in Slovenia. Bulls under 24 months of age of Slovenian Brown cattle had carcass weight 323.1 kg and net daily gain 504 g/day, while Charolais and Limousine bulls had heavier carcass weights (372.0 kg, 352.3 kg) and higher net daily gain (609 g/day, 565 g/day), respectively.

Albertí *et al.* (2008) conducted a large study of carcass characteristics of bulls belonging to fifteen western European cattle breeds. In the study, 15 months old slaughtered bulls of beef, dairy as well as local breeds reared at very similar environmental conditions were included. The lightest breeds at slaughter were Highland, Jersey and Casina, which showed also great similarity in carcass weight and net daily gain to Cika bulls from our study. All others included bulls from different beef and dairy breeds, had better net daily gains and higher carcass weights. Carcass weight of Highland and Casina bulls were 245.1 kg and 244.7 kg compared to Cika bulls (260.3 kg). Average net daily gain of Cika bulls was similar to Jersey (457.4 g/day) and Highland bulls (480.0 g/day). The reason for similarity between Cika and Jersey bulls could be in brachycerous origin of both breeds.

As previously mentioned, Pinzgauer sires had a role in the past in development of Cika breed. So we compared also carcass characteristics of Pinzgauer and Cika bulls. Kogel *et al.* (1997) found that Pinzgauer bulls slaughtered at 500 days (16.7 months) had carcass weight of 360.3 kg and net daily gain of 721 g/day, which is higher compared to Cika bulls from A category slaughtered at an average age of 18.6 months. Pinzgauer bulls had 100 kg heavier carcass weight and better net daily gain, which points to the morphological differences between both breeds.

We decided to take a precise look on the conformation and fatness scores of bulls and calves (Table 4), because they represent the highest share of all slaughtered Cika cattle in Slovenia. The majority of bulls under 24 months of age and calves were classified in O conformation class (57.1 and 47.8%). However bulls from B category were slightly more often classified into class R (45.3%) than into class O (41.1%). However, 36.7% of bulls under 24 month of age and 41.8% of calves were classified in class R. The effect of brachycerous origin of Cika cattle and extensive fattening on pasture may be the reason for relatively low conformation scores.

Fatness scores (Table 4) were a little bit different by categories. The majority of calves (88.1%) were classified in fatness class 2; likewise 55.8% of carcasses of bulls under 24 months of age and 49.5% of bulls over 24 months of age. Problems of over fatness (fatness class 4 and 5) did not occur in slaughtered Cika cattle, whereas more than 10% of calves had too low fatness.

Table 4. The conformation and fatness scores for slaughtered bulls of A and B category and calves in the years from 2005 to 2007

Preglednica 4. Ocene za mesnatost in zamaščenost za zaklane bike A in B kategorije ter teleta v letih 2005 do 2007

	Score Ocena	Bulls under 24 months (A category)		Bulls over 24 months (B category)		Calves (T category)	
		Biki stari do 24 mesecev (A kategorija) (n = 197)		Biki starejši od 24 mesecev (B kategorija) (n = 95)		Teleta (T kategorija) (n = 67)	
Conformation Mesnatost	E	0	0.0%	0	0.0%	0	0.0%
	U	4	2.0%	7	7.4%	3	4.5%
	R	72	36.7%	43	45.3%	28	41.8%
	O	112	57.1%	39	41.1%	32	47.8%
	P	8	4.1%	6	6.3%	4	6.0%
Fatness Zamaščenost	1	7	3.6%	4	24.2%	7	10.5%
	2	110	55.8%	47	49.5%	59	88.1%
	3	78	39.6%	41	43.2%	1	1.5%
	4	2	1.0%	3	3.2%	0	0.0%
	5	0	0.0%	0	0.0%	0	0.0%

Most of Cika cattle are reared extensively on small farms, mostly on mountain pastures without any additional concentrates. This could present the basis and the opportunity for Cika breeders to promote beef from Cika cattle and to increase their income.

## CONCLUSIONS

The obtained results showed the increased number of slaughtered Cika cattle in the last three years. Great variability in carcass traits of slaughtered Cika cattle, which indicate great heterogeneity also in phenotypic traits, was identified. The population is consisted of light phenotype of Cika cattle with the emphasis on milk production and a bit heavier phenotype of Cika cattle with larger frame and larger body weight very suitable for extensive beef production in cow-calf system on pastures. Nevertheless, autochthonous Cika of both phenotypes is well adapted to the environment and also helps to maintain biodiversity and sustainable agricultural production, especially in areas less suitable for agriculture.

## POVZETEK

Cika je edina avtohtona pasma govedu v Sloveniji, katere populacija je v letu 2007 štela okrog 1600 živali. Rejski cilj za cikasto govedo je kombinirana usmeritev s poudarkom na prireji mleka. Kljub temu cikasto govedo redijo v večini primerov v sistemu krava-tele. V manjši meri pa pasmo še vedno uporabljajo za prirejo mleka v tradicionalnih regijah za planšarstvo. Glavni namen raziskave je bil dobiti vpogled v klavno kakovost cikastega goveda, kakor je bila ovrednotena na klavni liniji. Podatki, uporabljeni v raziskavi, so bili zbrani v klavnicah v letih od

2005 do 2007. Cikasto govedo je v letu 2007 predstavljalo le 0,24 % vsega zaklanega goveda v Sloveniji. Zaklano govedo po kategorijah je bilo zelo raznoliko v masi klavnih polovic, kar je vidno v precej velikih standardnih odklonih. Povprečna masa klavnega trupa kategorije A (biki do starosti 24 mesecev) je bila 260,3 kg. Biki starejši od 24 mesecev (B kategorija) so bili v povprečju težji (322,0 kg), a so imeli manjši dnevni neto prirast v primerjavi z biki v A kategoriji. Masa klavnih polovic zaklanih volov je bila 247,2 kg in je zelo podobna masi klavnih polovic bikov iz A kategorije. Krave do starosti pet let so imele maso klavnih polovic v povprečju 235,6 kg, medtem ko so klavne polovice krav starejših od pet let tehtale v povprečju 257,5 kg. Povprečna masa klavnih polovic telic je bila zelo majhna (193,3 kg) in telet 91,3 kg. Teleta so imela tudi najboljše dnevne neto priraste (706,6 g/dan) izmed vseh kategorij zaklanih živali cikaste pasme. Večina bikov v starosti do 24 mesecev (57,1 %) in telet (47,8 %) je bila razvrščena v O razred za mesnatost. Večina bikov starejših od 24 mesecev (45,3 %) pa je imela ocenjeno mesnatost z R razredom. Večina telet (88,1 %) je bila razvrščena v 2 razred za zamaščenosti in prav tako 55,8 % bikov starih do 24 mesecev in 49,5 % bikov starih nad 24 mesecev. Cikasto govedo pogosto redijo na majhnih kmetijah, ekstenzivno na paši brez dodajanja močnih krmil. Tako je avtohtona cika zelo prilagojena na okolje in pomaga ohraniti biodiverzitetu in sonaravno kmetijsko proizvodnjo, še posebno na marginalnih območjih. To bi lahko bila priložnost za rejce cikastega goveda, za promocijo pasme in na tak način prirejenega mesa.

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