

**MEAT EFFICIENCY OF BULLOCKS OF THE BLACK PIED BREED FINISHED TO A LOWER SLAUGHTER WEIGHT**

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**Summary**

Our experiments involved 46 Black Pied bullocks of genotype H<sub>1</sub> (minimal proportion of Holstein blood 87.5%) housed in stanchionless sheds and fed a concentrated diet based on mashed cereals; the average weight of carcass meat was 190 kg, carcass weight 366 kg, age 360 days, carcass yield 51.9%, daily increment and net increment 1048 g and 552 g, respectively. Using variance analysis we evaluated the effect of the weight of carcass meat and average daily body increment on the level of selected parameters of meat efficiency. With a higher weight of carcass meat the weight of hind and forequarters, shank from the hindquarter and shoulder increased highly significantly. The weight of the round and of the rib roast were significantly higher. The body increment had a highly significant effect on a lower weight at slaughter, higher daily increment and net increment. The carcass weight and weight of the shank from the hindquarter were significantly lower, carcass yield was higher.

Key words: Bullocks, fattening, Black Pied breed, carcass value

*Introduction and literary survey*

The objective of the present study was to analyse, on the basis of information from the grant project "Efficient production of veal and young beef", selected results of meat efficiency and quality of carcasses of pure-bred Black Pied bullocks of the H<sub>1</sub> genotype, i.e. with a proportion of more than 87.5% of blood of the Holstein breed, the main criterion being a range of weights of carcass meat from 170 kg to 209 kg.

The major part of the production of slaughter bullocks in Europe are animals of dual-purpose breeds, crosses between dairy and meat breeds and partly Friesian and Holstein-Friesian breeds (Faucon, 1986). The animals are fattened between 16 and 18 months of age. In some countries the bullocks of dairy breeds are used for the production of baby beef at the age of about 1 year

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(north Italy, Spain) and they are fattened mostly with cereals (Jarrige, Béranger, 1992) to 180-220 kg weight of carcass meat, what corresponds with special market demands.

In conditions of the Czech Republic the internal breed structure of the population of Black Pied cattle and its crosses is gradually changing. Since 1985, Holstein bulls are mostly used for insemination, or bulls with a high genetic proportion of Holstein. A lower competitiveness of slaughter bullocks fattened to a weight of 550-650 kg can be expected, providing opportunities for the application of other systems and methods of beef production (Heinrich, Kögl, 1992).

Conclusions of studies on the fattening of Black Pied bullocks do not always agree. Kahoun (1988) reported that with an increasing genetic proportion of dairy breeds, the meat efficiency decreased, as was expected; results of Urban, Dvořáček, Burda (1981) are similar. Also Averdung et al. (1974) recommended caution when using Holstein-Friesian cattle, particularly from overseas. Urban et al. (1976) stated that the main indicators of meat efficiency of Black Pied bullocks at a daily growth rate of 800 g, as well as the F1, F11 and F10 generations, are similar to the Bohemian Spotted cattle. Teslík et al., (1995) studied Black Pied bullocks (N) fattened to 530 kg and found that they could be successfully fattened at a high intensity to a higher carcass weight. Also Chládek et al. (1996) was involved in studies of the meat efficiency of Black Pied bullocks weighing 430-530 kg. The different results are generally based on the effect of various genotypes and proportions of continental or overseas provenance (Golda, Čížek, 1982).

In Slovakia, Nosál, Pavlič (1988) studied the carcass value and associated indicators at a lower carcass weight (350, 400, 450 kg) in crosses of the Slovakian Spotted cattle with a high genetic proportion of the Black Pied breed. They found that the carcass yield was 54.76%, 55.80% and 56.54%, respectively, and, on the contrary, that the proportion of 1st class meat decreased. Palanská, Nosál (1989) studied meat quality at low carcass weights in Black Pied cattle.

### *Material and methods*

Male calves were purchased from herds of Black Pied cattle with a minimal genetic proportion of Holstein cattle of 87.5% (code H1). The calves were housed in stanchionless stalls on sawdust litter. Nutrition was provided for average daily increments of 1300 g in accordance with recommended tabular values for fattening bulls of dairy breeds (Sommer et al., 1994). The feed ration was based on an *ad lib* uptake of mashed cereals (wheat + barley 1:1) and limited uptake of protein concentrate and alfalfa hay (14.95% of the

dry matter of the feed ration). Cereals were prepared (mashed) using cylindrical mashers, alternatively ENGL Potential 55-28 (input 5.5 kW), or ROMILL M 300 (input 5.5 kW).

All the 46 bullocks of the studied group were gradually slaughtered at selected slaughter houses according to the intended methods in order to obtain a survey of the carcass value, within the range of 170-209 kg of carcass meat. On the day of slaughter the weight of carcass meat was taken as the basic indicator, and also the weight of kidneys, kidney tallow, liver and spleen; 24 hours after slaughter the carcass was cut (division of carcass halves) according to charts of cutting lists (print P 57, Bour. H3 and H4).

All results were elaborated by multi-factorial variance analysis using the STATGRAPHICS programme, version 6.0.

### Results

Table 1. shows that the average body weight before slaughter (slaughter weight) of the 46 bullocks was 366 kg; the weight of carcass meat was 190 kg, giving a carcass yield of 51.9%. The average age at slaughter was 360 days, the average daily increment of the experimental animals up to this age was 1048 g and net increment was 552 g.

Table 1. - SELECTED INDICATORS OF THE FATTENING CAPACITY OF THE STUDIED GROUP OF BULLOCKS

Indicators	Units	x	s <sub>x</sub>	V(%)	1		2	
					Carcass weight (kg)		Daily body increment (g/day)	
					lower 170-189	higher 190-209	lower/less than 999	higher above 1000
Number	heads				25	21	20	26
Slaughter weight	kg	366	27.3	7.5	346A	390B	383a	354b
Age at slaughter	days	360	64.5	17.9	324A	403B	414A	319B
Carcass weight	kg	190	11.9	6.3	180A	201B	196	185
Carcass yield	%	51.9	1.75	3.37	52.1	51.6	51.2a	52.3b
Daily increment	g	1048	197	18.8	1105	979	888 A	1171B
Net increment	g	552	113	20.5	584	513	459A	623B

A, B = (P < 0,01)

a, b = (P < 0,05)



Comparisons of both sub-groups (Tab. 1.1) show that the carcass weight, age at slaughter and weight of carcass meat were highly significantly higher, what can logically be explained, while the differences in carcass yields, average daily increment and net increment were insignificant. The levels of average daily increments were highly significantly higher, as expected, as were the net increments, the carcass yields were significantly higher with a highly significantly lower age at slaughter and significantly lower body slaughter weight.

Table 2. - WEIGHT OF HINDQUARTERS AND SELECTED PARTS OF CARCASS MEAT OF BULLOCKS

Indicators	Units	x	s <sub>x</sub>	V(%)	1		2	
					Carcass weight (kg)		Daily body increment (g/day)	
					lower 170-189	higher 190-209	lower/less than 999	higher above 1000
Number	heads				25	21	20	26
Hindquarter	kg	51.8	3.89	7.33	49.3A	54.9B	53.4	50.7
Round	kg	18.5	2.60	14.05	18.2a	18.9b	18.3	18.6
Short loin	kg	3.6	0.50	13.88	3.5	3.8	3.7	3.6
Sirlon	kg	1.2	0.17	14.17	1.2	1.2	1.3	1.2
Shank	kg	1.8	0.65	36.11	1.5A	2.2B	2.2a	2b
Meat trimmings	kg	7.0	3.02	43.14	6.4	7.7	7.3	6.8

A, B = (P < 0,01)

a, b = (P < 0,05)

Results in Table 2. show that the average weight of right hindquarters was 51.8 kg, the weight of round being 18.5 kg, short loin 3.6 kg, sirloin 1.2 kg, shank 1.8 kg and total meat trimmings 7.0 kg. Due to the highly significantly higher weight of carcass (Tab. 1.1), the weights of the entire hindquarter and shank were highly significantly higher and the weight of round was significantly higher. The weights of short loin, sirloin and meat trimmings were not significant, although the trends in short loin and meat trimmings were very marked (Tab. 2.1). The effect of the average daily increment on the weights of the individual selected parts was not statistically significant, with the exception of shank (Tab. 2.2). This significance could be associated with differences shown in Table 1.2 (carcass weight) and in Table 2.1 (weight of hindquarters).

Table 3. - WEIGHT OF FOREQUARTERS AND SELECTED PARTS OF CARCASS MEAT OF BULLOCKS

Indicators	Units	x	s <sub>x</sub>	V(%)	1		2	
					Carcass weight (kg)		Daily body increment (g/day)	
					lower 170-189	higher 190-209	lower/less than 999	higher above 1000
Number	heads				25	21	20	26
Forequarter	kg	41.4	4.79	11.57	38.8A	44.5B	44.0	39.5
Shoulder	kg	6.0	0.75	12.50	5.8A	6.3B	6.1	5.9
Neck	kg	4.3	0.88	20.46	4.2	4.5	4.5	4.2
Rib roast	kg	4.2	0.80	19.05	4.0a	4.5b	4.4	4.1
Shank	kg	3.5	0.65	18.60	3.4	3.7	3.7	3.4
Meat trimmings	kg	5.3	2.36	44.52	4.8	6.0	5.7	5.1

A, B = (P < 0,01)

a, b = (P < 0,05)

In terms of the forequarters (Tab. 3) of bullocks of the sub-group with higher weights of carcass meat, the weights of forequarters and shoulder were highly significantly higher, the weight of rib roast significantly higher. The differences of the other values were insignificant. All the differences with a lower or higher average daily increment were also statistically insignificant (Tab. 3.2).

In terms of the weights of forequarters and hindquarters (Tab. 2 and 3), the weight of the forequarters (41.4 kg) represented 44.4% and of the hindquarters (51.8 kg) relatively 55.6%.

### Discussion

The present study provides basic information about results of meat efficiency expected when fattening Black Pied bullocks in the Czech Republic, gradually including more breeding bulls of the extremely dairy Holstein cattle in the herds. It shows the absolute lower level of fattening, sometimes indicated as baby beef, as reported by Jarrige, Béranger (1992) for instance for Italy and Spain; in our case also when using high amounts of cereals in the feed ration.

The carcass yield of bullocks of the expressively dairy type in the studied group of animals is very close to values found by Anderson et al. (1991) in

Danish Black Pied cattle. With the same slaughter weight (350 kg) given by Nosál, Pavlič (1988), in our investigations the carcass yield of bullocks was by 2.86% lower, what was due to a certain degree of genetic proportion of the combined breed in animals used by the authors in the present experiments.

The level of average daily increments of all the bullocks of the group studied (1948 g) and of animals of the sub-group where the weight of the carcass meat was lower (1105 g) corresponds with the results of Arpacik et al. (1994). The results of the present study in the proportion of the weight of fore and hindquarters (44.4% and 55.6%, respectively) differ considerably from general values for bulls given by Dvořák (1987) (i.e. 56.6% and 43.4%, respectively). Also results achieved by Urban et al., (1976) and Teslík et al., (1995) with the same breed or with crosses with its high genetic proportion are different, although the body weight was virtually the same - Nosál, Pavlič (1988). The conclusions of Kahoun (1988) and Urban et al., (1981) confirm our results on the percentage of carcass yield.

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### **PORAST MIŠIČNE MASE VOLOVA PASMINE BLACK PIED KOD NIŽIH KLAONIČKIH TEŽINA**

#### **Sažetak**

U eksperimentu je bilo uključeno 46 volova genotipa H1 (najmanji udio krvi holštajna 87.5%). Smješteni su bili u odijeljene nadstrešnice i hranjeni koncentriranom hranom baziranom na žitaricama. Prosječna težina mesa u trupu je bila 190 kg (51.9%), težina trupa 366 kg, dob 360 dana, dnevni prirast 1048 g, a neto prirast 552 g. Koristeći analizu varijance vrednovali smo utjecaj težine mesa u trupu i prosječni dnevni prirast na razinu odabranih pokazatelja učinkovitosti rasta mišićne mase. S većom težinom mesa u trupu, težina stražnjih i prednjih četvrti, koljenice stražnje četvrti i plečke bila je značajno viša. Težina buta i rebara bile su signifikantno više. Porast težine tijela značajno je utjecao na težinu kod klanja, visinu dnevnog prirasta i neto prirasta. Težina trupa i težina koljenice bila je značajno niža a randman viši.

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