



Original Contribution

**STUDY ON THE INFLUENCE OF SOME FACTORS ON THE PRINCIPAL
SLAUGHTER INDICES IN BULLOCKS**

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ABSTRACT

The aim of this study is to establish the influence of the breed and the fattening system on the principal meat yield indices in bullocks. 87 bullocks from four breeds have been included in the experiment. They have been kept according two systems: in a barn and in a combined way (at pasture and a finishing fattening).

A complete slaughter analysis of 58 bullocks has been made. The three crossbreeds bullocks have the highest meat percentage (82.41%) and the lowest bone percentage (17.59%), followed by the Hereford (80.67% and 19.33%). The bullocks of Native Gray cattle have the worst ratio between the tissues in the carcass. From the analysis, made on the variance, it has been established that only the breed of the bullocks has a reliable influence on the indices studied

Key words: Bullocks breed, fattening systems, meat yield

INTRODUCTION

One of the essential indices in the beef cattle is the quantity of the different tissues in the carcass. The ratio of these tissues determines the quality composition of the carcass meat and to a great extent depends on the breed, the slaughtering age, the system of feeding and breeding etc. At the same time some of the indices are interrelated and of high and positive correlation. According to Kempster A. et al. (1) these dependences are used in the selection for increasing the meat yield, and some of them are used as indices in the classification and rating of carcasses in the purchasing as well. Gorinov Ya.(2) has established positive and significant phenotype correlations of the cool carcass weight and the carcass meat(0.980) and the carcass bones(0.544). Amer P.et al.(3) have studied a broad range of productive qualities in beef cattle in Canada. Limousin, Charolais and Simmental have a better carcass quality and fewer removable fats. In Bulgaria Kalev R. (4), Todorov M. (5) and others have made a similar interbreed assessment of the principal exterior and meat yield indices. Shain D. et.al (6) has carried out a comparative experiment in fattening of bullocks in a combined

breeding system. The authors have established that the duration of the pasture period, as well as pasture composition have a reliable influence on the weight gain of the bullocks during pasture. It is necessary to make the different indices precise in order to form a precise quality assessment system of cattle carcasses, aiming to achieve an effective fattening and the maximum quantity of meat of the desired quality. The indices, used in Bulgaria up to now - live weight and slaughter yield (in %) - do not have the required high positive dependence on the principal indices of meat yield, underlying the European system of assessment and payment.

The aim of the present study is to establish the influence of the breed, the fattening system and the age on the principal slaughter indices in bullocks.

MATERIALS AND METHODS

For achieving the set purpose an experiment for fattening bullocks from four breeds: Poll Hereford (PH, n = 33), Native Gray cattle(NGC, n = 22), Black and White breed(BWB, n = 16) and beef three crossbreeds of [Limousin x F1(PH x BWB)] (R1, n = 16) has been carried out. The bullocks of each breed group have been divided into two sub groups according to the fattening system - in a barn all year round/(b) and in a combined way/(c), including a pasture period

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and a finishing fattening period in a barn. During the barn fattening in both systems the bullocks have been reared in the same conditions-free, in stalls. In the barn fattening all the groups have been fed free choice with identical in composition full ration mixture on the basis of 50% straw. In the combined fattening the pasture period has begun early in spring, in April, and has continued till the end of October. The fattening of bullocks has gone on till achieving the desired slaughter live weight which is respectively 350 kg for NGC and 450kg for the other breeds. The final live weight is in conformity with the operative normative basis BG Standards 873-73. The average slaughtering age of bullocks is 21 months. A complete slaughter analysis has been made of 58 of them.

Linear models have been used in order to study the variation and the relationship between factors and signs. The solutions of the equations have been done by the synthesized method of the least squares, and the components of the variances have been assessed according to the ANOVA paradigm.

In order to establish the degree of influence of the different factors the following model of the most general kind has been used:

$$Y_{ijk} = \mu + A_i + F_j + e_{ijk}$$

Where: Y_{ijk} is the dependent variable(the sign studied), μ is the average value for the excerpt; A_i is the i-st effect on each fixed factor, included as a class in the model; F_j is the j-st effect of the other fixed factors, corresponding to the non-class independent variables; e_{ijk} is the effect of the non-included accidental effects(except μ).

The essential statistic processing has been done by using the corresponding modules of "Statistika" program package (III STATISTIKA- N 1234).

RESULTS AND DISCUSSION

The most important index securing profitability of the meat processing industry is the quantity of meat as a percentage of the cool carcass weight. At the same time this is an index, reflecting the results of the applied selection programmes and the ways of meat animals breeding. The data in Table 1 show that the maximum quantity of meat is obtained from the carcass of R1 crossbreeds-82.41% and 81.36% ,where the bullocks, fattened in a combined way, have the advantage. The next result has been established in the purebred bullocks BH in a barn - 80.67%. These results indisputably confirm the advantage of the meat breeds in relation to the marked slaughter indices. The results of BWB/combined fattening(80.15%)/ and BH/ combined fattening(78.28%)/ follow immediately behind them. The least quantity of meat is removed from the carcass of NGC/combined fattening(78.28%), which is characteristic of that breed. The quantity of bones as a carcass percentage of the slaughtered bullocks follows an opposite direction in conformity with the quantity of the removed meat. The beef crossbreeds R1 have the least quantity of bones and the NGC have the most of them. A regular relationship in reference to the influence of the fattening system on the quantity of bones and, respectively on the carcass meat, has not been established.

Table 1. Composition and meat-bones ratio in the carcass.

Indices Groups	Number n	Meat, %	Bones, %	Meat, kg	Bones, kg	Meat/bones ratio
PH/barn	14	80,67±0,37	19,33±0,37	89,04±3,07	21,26±0,68	4,20±0,10
PH/comb.	9	79,72±1,04	20,28±1,04	82,48±2,66	21,04±1,38	4,03±0,24
NGC/barn	10	79,60±0,46	20,39±0,46	62,29±2,08	16,00±0,73	3,92±0,11
NGC/comb.	9	78,28±0,82	21,71±0,81	62,80±1,09	17,45±0,79	3,65±1,17
BWB/barn	3	78,71±0,53	21,29±0,53	90,87±3,10	24,57±0,83	3,70±0,11
BWB/comb	5	80,15±0,78	19,85±0,78	98,78±3,70	24,38±0,81	4,07±0,19
R1/barn	4	81,36±0,20	18,64±0,20	93,90±6,20	21,47±1,24	4,36±0,05
R1/comb.	4	82,41±0,50	17,59±0,50	97,60±3,39	20,77±0,28	4,70±0,16

Table 2. Analysis of the variance for the influence of the breed, the fattening system and the slaughtering age on the meat and bone percentage and their ratio in the cool carcass

Sources of variation	Freedom degree n-1	carcass meat, % F	carcass bones, % F	meat/bone ratio F
Generally for the model	68	1,38-	2,33*	1,59-
μu-γμ	1	0,08-	0,36-	0,11-
Breed	4	2,43*	3,08*	3,04*
Fattening system	1	0,90-	0,74-	0,34-
Slaughtering Age	3	0,16-	0,29-	0,19-

The ratio between the absolute values of the quantities of meat and bones in the carcass of the slaughtered animals is an index, reflecting both the breed characteristics and the effect of the applied fattening system. The data in Table 1 show that the ratio in the carcass of the beef crossbreeds R1/combined - 4.70 and 4.36 in R1/barn have the highest value and respectively the most favourable ratio. Follow BH/barn – 4.20 and BH/combined – 4.03. In the other breed groups the values are lower and with comparatively small differences. The bullocks form NGC/combined have the worst ratio between the carcass tissues. These results confirm once again the advantage of the meat breeds in meat production regardless of the fattening system. The principal indices, important for the meat processing as well as determining the evaluation according to the requirements of the European Union, are the percentages of meat and bones in the cool carcass and their ratio. For this reason the influence of the breed, the fattening system and the slaughtering age on these indices has been studied (Table 2). The analysis showed that only the breed of the bullocks has a reliable influence on the indices studied. In spite of the difference in the slaughtering age, all the bullocks are aged up to 2 and they fall in the same age category at purchasing according to the existent normative basis. This fact presupposes that the age variation in the range of the category should not have considerable influence on the indices of meat yield.

CONCLUSIONS

The bullocks of the three crossbreeds have the highest percentage of meat and the lowest one of bones, followed by Hereford. The bullocks of the NGC have the worst ratio between the tissues of the carcass.

Only the breed of the bullocks has a reliable influence on the principal indices in the meat yield - the meat percentage and the bone percentage in the carcass.

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