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Carcass characteristics and valuable cuts of slaughtered dairy and beef cows from seven different breeds

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The objective of the present study was to determine carcass traits of dairy and beef breed cows in the Finnish cattle population. The data collected from a Finnish slaughterhouse included observations of 7 522 Holstein (HO), 6 367 Nordic Red (NR), 422 Limousin (LI), 180 Hereford (HF), 119 Simmental (SI), 117 Angus (AB), and 93 Charolais (CH) cows. The carcasses were graded for conformation and fat score in accordance with the EU beef carcass classification scheme (EUROP) on a continuous 15-point scale. The NR dairy cows had better conformed and fatter carcasses compared to HO cows ($p < 0.001$) but the yields of tenderloin, inside round and roast beef were higher in HO compared to NR cows ($p < 0.01$). In beef cows, British breeds (AB, HF) had lower conformed carcasses and higher yield of surface fat compared to Continental breeds (CH, LI, SI) ($p < 0.05$). Slaughter weight of HO and NR cows was positively correlated to carcass conformation score, carcass fat score and surface fat yield. The yields of tenderloin, inside round and roast beef decreased in both breeds as slaughter weight increased. Slaughter weight had no effect on loin and entrecote yields.

Key words: beef production, carcass weight, carcass conformation, carcass fatness

Introduction

Meat production from dairy cows is a significant part of beef production (Moreira et al. 2021, Vlemminx et al. 2023, Berdusco et al. 2024). Moreira et al. (2021) concluded that more than three million head of dairy cows enter the food supply chain in the United States every year accounting for almost 10% of U.S. commercial beef production. Overall, approximately 21% of the beef produced in 2019 in the U.S. came from the dairy sector (Moreira et al. 2021). In EU, slaughtered dairy cows account for around 27% of total beef and veal production (Vlemminx et al. 2023). In Finland, the importance of dairy cattle in beef production is clearly greater than in many other countries since dairy breeds accounted for approximately 80% of the produced beef (Huuskonen et al. 2025). The share of slaughtered dairy cows alone is about 20% of the beef produced in Finland. However, the decrease in the dairy cattle population observed in recent years threatened to reduce the level of beef production, and therefore beef cow production may have greater significance in the future. Currently, there is a clear discrepancy between the demand and supply of domestic beef in Finland and beef self-sufficiency is approximately 90%. Huuskonen et al. (2025) calculated that if Finland were self-sufficient in beef, with the current number of dairy cows, the number of beef cows should increase from the current 64 000 to approximately 90 000 beef cows.

In beef production carcass composition largely determines carcass value (Pesonen 2020). A high proportion of muscle with an optimum level of fat dictated by local consumer preferences represents a superior carcass. Differences between individual cattle breeds in carcass traits have been extensively evaluated, for example, by Bartoň et al. (2006), Cuvelier et al. (2006), Alberti et al. (2008), Pesonen et al. (2012, 2013a,b) and Pesonen (2020). Huuskonen (2014) observed that in the Finnish beef cattle population the carcasses of the Nordic Red (NR) bulls were better conformed and carcass fat score was higher compared to the Holstein (HO) bulls. For beef breed bulls and heifers, Pesonen and Huuskonen (2015) reported that the later maturing Continental beef breeds, Charolais (CH), Limousin (LI), Simmental (SI) and Blonde d'Aquitaine (BA), seemed to produce less fat and had more valuable cuts compared to the earlier maturing British beef breeds, Angus (AB) and Hereford (HF). However, limited information seems to be available on the carcass traits of slaughtered cows. On that account, it is justified to agree with Moreira's et al. (2021) statement "Although the dairy cow is an essential contributor to the meat industry there is still not enough research and attention dedicated to this topic". Therefore, the main objective of the present research based on a dataset collected from a Finnish slaughterhouse was to study carcass traits of dairy and beef breed slaughtered cows in Finnish beef cattle population. The second objective was to evaluate the effects of

slaughter weight and slaughter age on carcass quality in dairy cows. Based on earlier studies with growing cattle (Huuskonen 2014, Huuskonen et al. 2020) it was hypothesised that slaughtered NR dairy cows would have better conformed and fatter carcasses compared to HO cows. In addition, it was hypothesised that the later maturing Continental beef cows would produce less fat and have higher yields (g kg^{-1} carcass weight) of valuable cuts compared to the earlier maturing British breeds.

Materials and methods

Data

A dataset used was collected from a Finnish slaughterhouse (Snellmanin Lihanjalostus Ltd., Pietarsaari, Finland). The data included all cows slaughtered between 1 January 2021 and 31 May 2023. All purebred AB, CH, HF, HO, LI, NR and SI cows that were slaughtered during the above-mentioned period were selected for the study. The complete slaughter data comprised 14 820 slaughtered cows with the average slaughter age of 1 952 days (Table 1). The slaughter data for each animal included individual animal identification number on ear tag, date of birth, date of slaughter, breed, slaughter weight, carcass conformation score (EUROP) and carcass fat score (EUROP). The carcasses were weighed hot after slaughter and the cold slaughter weight was estimated as 0.98 of the hot slaughter weight. The carcasses were graded for conformation and fat score in accordance with the EU beef carcass classification scheme on a continuous 15-point scale (Conroy et al. 2010).

In addition to above-mentioned variables the dataset also included information of commercial cuttings. After classification the carcasses were chilled overnight below 7 °C. On the day after slaughter the carcasses were commercially cut. Each carcass was cut into the following cuttings: tenderloin (*Musculus psoas major*), loin (*Musculus longissimus lumborum*), entrecote (*Musculus longissimus thoracis*), inside round (*Musculus semimembranosus*), roast beef (*Musculus gluteus medius*), tendons, and tallow (surface fat). The amount of tallow was evaluated by cutting off the visible surface fat on the surface of primal cuts and by weighing the yield of tallow in grams. All these cuttings were weighed automatically on the slaughter line and their yields were expressed both in total kg and as percentages (g kg^{-1}) of the carcass cold weight 50 min *post mortem*.

The mean slaughter weight of the cows was 301 kg, the EUROP conformation score 3.0 and the carcass fat score 6.3. Information on cutting yields and standard deviations of variables are shown in Table 1. Slaughter weight and age regressions were calculated for the HO and NR breeds, for which there was a sufficiently large number of observations.

Statistical methods

Raw data contained product weights separately from two halves of the carcasses. Data was first checked for possible duplicate information. Only carcasses with recorded weights for both halves were included. Final product weights for the analysis were obtained by summing up the weights from two carcass halves.

Data was analysed separately for dairy breeds (HO, NR) and beef breeds (AB, CH, HF, LI, SI). The need for the logarithmic transformation in the statistical analysis was evaluated by comparing the distributions of a variable before and after the transformation. Analysis of variance (ANOVA) testing of the breed differences and pairwise comparisons of the breeds were done by using the SAS procedure GLIMMIX (SAS STAT 15.3). Kenward and Roger (2009) standard error and degrees-of-freedom correction was applied in the ANOVA testing and Tukey *p*-value adjustment from Royen (1989) for the pairwise comparison tests.

The slaughter weight and slaughter age regressions were estimated with SAS REG procedure (SAS/STAT 15.3) and the significance of the regression estimates was determined by using the White's heteroskedasticity-consistent standard errors (White 1980).

Table 1. Description of the experimental data

Variable	n	Mean	SD ¹⁾	q ₅ ²⁾	q ₉₅ ³⁾
Age at slaughter, d	14 820	1952	840.7	854	3489
Slaughter weight, kg	14 820	301	57.9	217	404
Conformation score, EUROP ⁴⁾	14 820	3.0	1.64	1.0	6.0
Fat score, EUROP ⁵⁾	14 820	6.3	3.28	2.0	12.0
Cuttings					
Tender loin ⁶⁾					
kg	14 758	4.2	0.90	3.0	5.6
from carcass yield, g kg ⁻¹	14 758	14.2	2.42	11.5	17.0
Loin ⁷⁾					
kg	14 756	8.7	2.39	5.6	12.7
from carcass yield, g kg ⁻¹	14 756	28.9	5.20	22.5	36.3
Entrecote ⁸⁾					
kg	14 033	5.3	1.61	3.4	7.4
from carcass yield, g kg ⁻¹	14 033	17.5	4.16	14.0	20.5
Inside round ⁹⁾					
kg	14 780	11.9	2.66	8.2	16.3
from carcass yield, g kg ⁻¹	14 780	39.8	6.52	32.1	47.7
Roast beef ¹⁰⁾					
kg	14 757	5.4	1.34	3.7	7.7
from carcass yield, g kg ⁻¹	14 757	18.2	3.34	14.5	22.7
Surface fat					
kg	14 820	8.5	5.73	2.2	19.5
from carcass yield, g kg ⁻¹	14 884	26.8	14.24	9.0	54.1
Tendons					
kg	14 820	2.1	0.85	1.1	3.4
from carcass yield, g kg ⁻¹	14 884	7.1	2.78	4.0	11.2

¹⁾SD: Standard deviation; ²⁾q₅ denotes the 5% quantile (approximately 5% of the variable values are smaller than this); ³⁾q₉₅ denotes the 95% quantile (approximately 95% of the variable values are bigger than this); ⁴⁾Conformation score: 1=poorest, 15=excellent; ⁵⁾Fat score: 1=leanest, 15=fattest; ⁶⁾*M. psoas major*; ⁷⁾*M. longissimus lumborum*; ⁸⁾*M. longissimus thoracis*; ⁹⁾*M. semimembranosus*; ¹⁰⁾*M. gluteus medius*

Results

The slaughter age of NR cows was 6% higher compared to HO cows ($p < 0.001$) (Table 2). The average slaughter weight of HO cows (302 kg) was 4% higher than that of NR cows (290 kg) ($p < 0.001$). The average carcass EUROP conformation and fat scores of NR cows were 24 and 12% higher compared to HO cows, respectively ($p < 0.001$).

Breed had significant effects on the yields of valuable cuts (Table 2). The yields (g kg⁻¹) of tenderloin, inside round and roast beef were higher in HO compared to NR ($p < 0.001$). On the contrary, the yields of loin and entrecote were 5 and 2% higher, respectively, in NR compared to HO ($p < 0.001$). In addition, the yield of surface fat was 14% higher in NR carcasses compared to HO carcasses ($p < 0.001$).

Table 2. Carcass characteristics and cuttings of dairy cows (Holstein [HO] and Nordic Red [NR]) in a Finnish slaughter dataset. Mean comparison test p -values in the fourth column.

	HO	NR	SEM ¹⁾	p -value
Number of animals	7 522	6 367	-	-
Age at slaughter, d	1 841	1 950	6.4	<0.0001
Slaughter weight, kg	302	290	0.4	<0.0001
Conformation score, EUROP ²⁾	2.5	3.1	0.01	<0.0001
Fat score, EUROP ³⁾	5.9	6.6	0.03	<0.0001
Cuttings				
Tender loin ⁴⁾				
kg	4.2	4.0	0.01	<0.0001
from carcass yield, g kg ⁻¹	14.2	14.1	0.02	<0.0001
Loin ⁵⁾				
kg	8.4	8.5	0.02	0.0468
from carcass yield, g kg ⁻¹	28.0	29.4	0.04	<0.0001
Entrecote ⁶⁾				
kg	5.3	5.2	0.01	<0.0001
from carcass yield, g kg ⁻¹	17.3	17.6	0.03	<0.0001
Inside round ⁷⁾				
kg	12.2	11.1	0.02	<0.0001
from carcass yield, g kg ⁻¹	40.7	38.5	0.05	<0.0001
Roast beef ⁸⁾				
kg	5.5	5.1	0.01	<0.0001
from carcass yield, g kg ⁻¹	18.2	17.8	0.03	<0.0001
Surface fat				
kg	7.9	8.7	0.05	<0.0001
from carcass yield, g kg ⁻¹	24.9	28.4	0.12	<0.0001
Tendons				
kg	2.1	2.1	0.01	<0.0001
from carcass yield, g kg ⁻¹	7.2	7.2	0.02	0.88

¹⁾SEM: standard error of the mean; ²⁾Conformation score: 1=poorest, 15=excellent; ³⁾Fat score: 1=leanest, 15= fattest; ⁴⁾*M. psoas major*; ⁵⁾*M. longissimus lumborum*; ⁶⁾*M. longissimus thoracis*; ⁷⁾*M. semimembranosus*; ⁸⁾*M. gluteus medius*

Among beef breeds, the average slaughter weight of AB cows was significantly lower than that of CH, LI and SI ($p < 0.05$), and HF cows had lower slaughter weight compared to CH and LI ($p < 0.05$) (Table 3). The carcass conformation score of Continental beef breeds was higher compared to British beef breeds ($p < 0.05$). Among Continental beef breeds, LI cows had higher conformation score compared to CH and SI ($p < 0.05$). Continental beef breeds had higher EUROP fat score compared to British beef breeds ($p < 0.05$).

Continental beef breeds had higher yields of tender loin, loin, inside round and roast beef compared to British beef breeds ($p < 0.05$) (Table 3). For the entrecote AB, CH, LI and SI cows had significantly higher yields compared to HF ($p < 0.05$). British breeds had higher yield of surface fat compared to Continental breeds ($p < 0.05$). Limousin carcasses appeared to contain relatively fewer tendons compared to CH, HF and SI breeds ($p < 0.05$).

Table 3. Carcass characteristics and cuttings of beef cows (Angus [AB], Charolais [CH], Hereford [HF], Limousin [LI] and Simmental [SI] in a Finnish slaughter dataset. Breeds with the different letters were significantly different ($p < 0.05$). For example, the slaughter weight of the AB breed (letter a) differs significantly from breeds b, d and e (CH, LI and SI).

	AB ^a	CH ^b	HF ^c	LI ^d	SI ^e	SEM ¹⁾	<i>p</i> -value
Number of animals	117	93	180	422	119	-	-
Age at slaughter, d	2 658	2 794	3 069	2 961	2 598	46.1	0.031
Slaughter weight, kg	338 ^{bde}	398 ^{ac}	359 ^{bd}	383 ^{ac}	374 ^a	2.7	<0.0001
Conformation score, EUROP ²⁾	5.5 ^{bde}	7.0 ^{acd}	5.2 ^{bde}	8.4 ^{abce}	6.6 ^{acd}	0.08	<0.0001
Fat score, EUROP ³⁾	9.4 ^{bde}	7.6 ^{ac}	9.7 ^{bde}	7.2 ^{ac}	7.3 ^{ac}	0.14	<0.0001
Cuttings							
Tender loin ⁴⁾							
kg	4.4 ^{bde}	6.0 ^{ac}	4.5 ^{bde}	5.9 ^{ac}	5.5 ^{ac}	0.04	<0.0001
from carcass yield, g kg ⁻¹	13.2 ^{bde}	15.4 ^{ac}	13.1 ^{bde}	15.6 ^{ac}	15.0 ^{ac}	0.09	<0.0001
Loin ⁵⁾							
kg	9.6 ^{bde}	13.2 ^{ac}	10.2 ^{bde}	13.8 ^{ace}	12.1 ^{acd}	0.12	<0.0001
from carcass yield, g kg ⁻¹	28.9 ^{bde}	33.3 ^{acd}	28.8 ^{bde}	36.0 ^{abce}	32.6 ^{acd}	0.22	<0.0001
Entrecote ⁶⁾							
kg	6.0 ^{bde}	7.4 ^{ac}	5.8 ^{bde}	7.0 ^{ac}	6.6 ^{ac}	0.09	<0.0001
from carcass yield, g kg ⁻¹	17.6 ^{cd}	20.5 ^c	16.5 ^{abde}	18.7 ^{ac}	18.0 ^c	0.29	<0.0001
Inside round ⁷⁾							
kg	12.4 ^{bde}	16.6 ^{acd}	12.0 ^{bde}	17.4 ^{abce}	15.6 ^{acd}	0.13	<0.0001
from carcass yield, g kg ⁻¹	37.4 ^{bcde}	42.7 ^{acd}	34.1 ^{abde}	46.0 ^{abce}	42.7 ^{acd}	0.29	<0.0001
Roast beef ⁸⁾							
kg	5.8 ^{bde}	8.0 ^{ac}	6.0 ^{bde}	8.4 ^{ace}	7.7 ^{acd}	0.07	<0.0001
from carcass yield, g kg ⁻¹	17.6 ^{bde}	20.6 ^{acd}	17.1 ^{bde}	22.0 ^{abce}	20.8 ^{acd}	0.14	<0.0001
Surface fat							
kg	15.9 ^d	12.5	17.0 ^d	9.7 ^{ace}	11.4 ^c	0.32	<0.0001
from carcass yield, g kg ⁻¹	43.3 ^{bde}	28.9 ^{acd}	42.5 ^{bde}	23.7 ^{abce}	29.0 ^{acd}	0.68	<0.0001
Tendons							
kg	2.3 ^b	2.8 ^{acd}	2.3 ^b	2.3 ^b	2.4	0.04	0.0002
from carcass yield, g kg ⁻¹	7.0	7.1 ^d	6.6 ^d	6.0 ^{bce}	6.6 ^d	0.10	<0.0001

¹⁾SEM: standard error of the mean; ²⁾Conformation score: 1=poorest, 15=excellent; ³⁾Fat score: 1=leanest, 15= fattest; ⁴⁾*M. psoas major*; ⁵⁾*M. longissimus lumborum*; ⁶⁾*M. longissimus thoracis*; ⁷⁾*M. semimembranosus*; ⁸⁾*M. gluteus medius*

The regressions of slaughter weight and age on carcass traits and valuable cuts are presented separately for both HO and NR breeds in Table 4. In general, slaughter weight had a greater effect than slaughter age on all analyzed variables. Although the effect of slaughter age was also statistically significant in several variables its R^2 values were low and practical significance is minimal. Slaughter weight was positively correlated to carcass conformation score, carcass fat score and surface fat yield in both breeds. The yields (g kg⁻¹) of tenderloin, inside round, roast beef and tendons decreased in both breeds as slaughter weight increased. Slaughter weight had no significant effects on loin and entrecote yields in either of the breeds.

Table 4. Slaughter weight and age regressions of the Nordic Red and Holstein breed cows

Variable	Alpha ¹⁾	β_{weight}^1	β_{age}^1	R ² _{weight}	R ² _{age}	R ² _{both}
Nordic Red						
Carcass conformation score	-1.309*	0.015*	-0.00002	0.484	0.009	0.484
Carcass fat score	-3.964*	0.040*	-0.0006*	0.446	0.001	0.466
Tender loin yield, g kg ⁻¹	18.433*	-0.014*	-0.0001*	0.196	0.010	0.197
Loin yield, g kg ⁻¹	30.666*	-0.001	-0.0004*	0.0006	0.006	0.006
Entrecote yield, g kg ⁻¹	16.759*	0.001	0.0003*	0.003	0.017	0.018
Inside round yield, g kg ⁻¹	48.603*	-0.030*	-0.0006*	0.114	0.023	0.124
Roast beef yield, g kg ⁻¹	21.421*	-0.011*	-0.0002*	0.071	0.012	0.076
Surface fat yield, g kg ⁻¹	-12.519*	0.151*	-0.002*	0.311	0.0001	0.318
Tendons yield, g kg ⁻¹	9.419*	-0.008*	0.000006	0.040	0.0009	0.040
Holstein						
Carcass conformation score	-1.484*	0.013*	-0.00006*	0.411	0.006	0.412
Carcass fat score	-6.573*	0.046*	-0.0007*	0.493	0.001	0.520
Tender loin yield, g kg ⁻¹	19.457*	-0.017*	0.0001*	0.219	0.002	0.221
Loin yield, g kg ⁻¹	28.860*	-0.001	-0.0002*	0.0004	0.002	0.002
Entrecote yield, g kg ⁻¹	17.036*	0.00006	0.0002*	0.0002	0.006	0.006
Inside round yield, g kg ⁻¹	52.823*	-0.039*	-0.00009	0.125	0.006	0.125
Roast beef yield, g kg ⁻¹	23.060*	-0.016*	0.00004	0.091	0.002	0.091
Surface fat yield, g kg ⁻¹	-16.566*	0.150*	-0.002*	0.328	0.0002	0.342
Tendons yield, g kg ⁻¹	9.411*	-0.008*	0.00009*	0.035	< 0.0001	0.036

¹⁾Regression estimates (intercept and two β values) are from the combined model (where both the slaughter weight and the slaughter age were regressors). Values of the R² measures, however, are from three separate regressions (from the regression with the slaughter weight as the only regressor, from the regression with the slaughter age as the only regressor, and from the combined regression). Significance for * denotes *p* value smaller than 0.05.

Discussion

Previous comparisons of differences between HO and NR dairy cows in carcass quality and cutting yields are limited. Therefore, interpretation of the results and comparing them with previous experiments is also limited. As expected, considerable variation in carcass traits and cutting yields was observed among breeds in the present study. In growing and finishing bulls it has been observed that the carcass conformation score of NR has been 12–14% higher compared to HO (Huuskonen 2014, Huuskonen et al. 2023) which is in line with the present results for dairy cows. Furthermore, in agreement with the present findings, Huuskonen (2014) reported that NR bulls had slightly higher carcass fat scores, whereas HO bulls had higher yields of tenderloin, inside round, and roast beef. Therefore, it appears that the differences in carcass quality between HO and NR breeds are very similar in cows and bulls.

Also, for beef breed cows, the observed differences between breeds were consistent with the results reported in previous experiments on growing cattle. Alberti et al. (2008), Pesonen and Huuskonen (2015) and Pesonen (2020) have reported significantly higher carcass conformation scores in Continental breeds compared to British breeds. Our observations are in line with previous results that Continental breeds are expected to produce leaner carcasses with lower fat cover compared to British breeds (Barton and Pleasants 1997, Alberti et al. 2008, Pesonen and Huuskonen 2015).

The proportions of muscle and fat in the carcass determines the amount of trimmed meat available for sale (Pesonen 2020). Previous studies have found that the EUROP conformation score and the yield of valuable cuts are not necessarily clearly related to each other (Aass and Vangen 1998, Craigie et al. 2012). Studies summarized by Craigie et al. (2012) indicated that the percentage of variation in carcass lean meat yield explained by the EUROP grid was much greater using the entire carcass (R² range 0.55–0.75) than using high-value cuts only (R² range 0.28–0.57). Similarly in the present study, the EUROP-conformation score did not explain the yield of valuable cuts well, as NR cows had better conformed carcasses compared to HO cows but the yields of tenderloin, inside round and roast beef were higher in HO compared to NR cows. The result is in line with Huuskonen (2014), who found

that the carcass yield of HO bulls, excluding loin, was higher compared to NR bulls. Among beef breeds in general, Continental breeds have a higher meat proportion compared to British breeds (Koch et al. 1976, Pesonen et al. 2013a,b, Pesonen and Huuskonen 2015) which was also observed in the present study.

To our knowledge, no previous studies on the relationship between slaughter weight and carcass quality in HO and NR dairy cows is available. However, Latta et al. (2024) reported a positive correlation between slaughter weight and subcutaneous fat thickness in Nellore, Nellore × Angus and Nellore × Caracu cull cows. As in the present study, slaughter weight has been found to be positively related to carcass conformation score and carcass fat score in several studies in growing and finishing cattle (Keane and Allen 1998, Huuskonen et al. 2014, Pesonen and Huuskonen 2015). In the present study, slaughter age had only minor effect on carcass characteristics of dairy cows. Similarly, Drachmann et al. (2025) found that parity had no effects on EUROP conformation or fat score of culled HO cows.

One option for reducing the discrepancy between the demand and supply of domestic beef in Finland could be to increase the slaughter weight of cows, for example through final conditioning. Based on the present study, increasing slaughter weights would increase the conformation score and fat content of carcasses but could reduce the proportion of valuable cuts. There are several perspectives on carcass fattening. On the one hand, increased fat content can improve the eating quality of meat (Pesonen 2020) but on the other hand, consumers in Finland generally favour low fat products (Herva et al. 2011). Increasing slaughter weights naturally increases the weight of the valuable cuttings like fillets. This can be detrimental to restaurants and consumer packing if the surface area of the loin is too large. In this case, thinner steaks have to be cut so that the weight of the steak and, as a result, the price does not increase too much. However, Maples et al. (2018) observed that most consumers prefer thicker cut steaks with smaller surface areas over thinner steaks with larger surface areas.

Conclusions

To our knowledge, the present study is the most extensive study published to date describing the carcass quality of Finnish dairy and beef cows. As hypothesized slaughtered NR dairy cows had better conformed and fatter carcasses compared to HO cows. Nevertheless, the yields of tenderloin, inside round and roast beef were higher in HO compared to NR cows which means that a better EUROP conformation score does not necessarily mean a higher amount of valuable cuts. In beef cows, British breeds had lower conformed carcasses and higher yield of surface fat compared to Continental breeds. It was also found that the slaughter weight of dairy cows is negatively correlated with the yield of certain valuable cuttings. Increasing the slaughter weights can increase total meat production, but it may have a more negative than positive effect on the percentage of valuable cuttings. In addition, increasing slaughter weight also increases the fat content of the carcasses, which can have both negative and positive effects.

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