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# Slaughter and Carcass Traits of Young Brown Swiss Bulls Raised in Semi-Intensive System

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**Abstract:** The study was carried out to investigate some slaughter and carcass traits of young Brown Swiss bulls raised under semi-intensive system. Young Brown Swiss bulls were slaughtered at 24 months of age. The average slaughter weight, hot carcass weight, chilling carcass weight, hot dressing percentage and chilling dressing percentage were 328.40, 189.02, 186.99 kg, 57.56 and 56.93%, respectively. Carcass length, chest depth, rump length, rump circumference, arm length and arm circumference were 151.52, 63.70, 70.22, 70.37, 59.80 and 52.57 cm, respectively. Correlation coefficients for slaughter characteristics and carcass measurements of young Brown Swiss bulls were obtained. In general, positive correlation coefficients were observed for slaughter characteristics. Positive correlation coefficients for slaughter characteristic were high and significant. Only correlations between heart weight with spleen weight and all slaughter traits with internal fat weight were negative and not significant. Significant negative correlation coefficients were found between rump length with chest depth, arm length with rump circumference, arm circumference with rump circumference, arm length with arm circumference from carcass measurements. Overall, the results of the present study suggest that young Brown Swiss bulls can be used in beef production in semi-intensive system and carcass evaluation on different slaughtering weights in different breeding systems can be recommend.

**Key words:** Cattle, Brown Swiss, slaughter traits, carcass traits, semi-intensive

## INTRODUCTION

Turkey is rank 8 in number of cattle of the world. This figure third puts Turkey on place among OECO countries. In the contrary numbers of animals, animals have very low productivity. A great progress has been obtained in recent years. Turkish cattle population is consisted of 15.7% of exotic western breeds, 42.6% cross breed and 41.7% native breed (Gurel and Koc, 2005). In recent years, the number of exotic western cattle breeds in Turkey has been raising. Furthermore, while the intensity of semi-intensive breeding system has increased, the intensity of extensive breeding system has decreased. 40.5-45.0% of Turkey cattle population is raised in semi-extensive and extensive systems, respectively (Sekerden, 2009). Dual-purpose exotic Western breeds and native breeds are the main source of beef in Turkey. Exotic cattle breeds grow faster than native breeds. The Brown-Swiss is the most common exotic cattle breed raised in Turkey. About 74.6% of the total red meat production in Turkey is obtained from cattle breeding (TUIK, 2009). Carcass characteristics can be achieved by changing the genotype (Cundiff, 1970), nutrition and management practices (Morgan, 1979). Furthermore, age and weight will be considered together because they are closely related (Kirton, 1982). Slaughtering and carcass traits of Brown-Swiss cattle raised under semi-intensive system in Turkey have not been thoroughly investigated.

The purpose of the current study was to investigate slaughtering and carcass traits of young Brown-Swiss bulls raised under semi intensive system.

## MATERIALS AND METHODS

A total of 60 bulls of Brown-Swiss genotype were used in this study. Ten months-old Brown Swiss calves were utilized in the experiment. The feeding regime was divided into Summer and Winter periods. The animals remained on the same pasture, where no feeding supplementation was offered when weather conditions permitted during early and late summer. However, the animals had ad-libitum access to concentrate feed (2500 kcal $kg^{-1}$ ME ve 12% crude protein) and dry alfalfa hay during early autumn and winter.

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Young Brown Swiss bulls were slaughtered at 24 months of age. The animals were kept off feed 24 h before slaughtering, but provided access to water at throughout the experiment. Brown Swiss bulls were slaughtered in the Meat and Fish Establishment (Et Balik Kurumu, EBK) in Van, Turkey. Immediately hot carcass, head, hide, liver, lung, heart, internal fat, kidney and spleen were weighed. Hot dressing percentage was calculated as the proportion of the hot carcass weight to live weight. Some carcass measurements such as carcass length, chest depth, rump length, rump circumference, arm length and arm circumference were determined. Carcass length was measured from the center of the first rib to the center of the pubic symphysis (Du Plessis and Hoffmann, 2007). After slaughter, carcasses were stored for 24 h at 4°C and carcasses were weighed and chill carcass weights were recorded for each carcass. Chilling dressing percentage was calculated as the proportion of the chill carcass weight to live weight.

Descriptive statistics were calculated using the MEANS procedure of SAS. Correlations between slaughter and carcass characteristics were also calculated by using the SAS (1985).

## RESULTS AND DISCUSSION

Means, standard errors, coefficients of variance for slaughters traits and percentages of slaughter traits to slaughter weight in young Brown Swiss bulls are shown in Table 1. The average slaughter weight, hot carcass weight, chilling carcass weight, hot dressing percentage and chilling dressing percentage were 328.40, 189.02, 186.99 kg, 57.56 and 56.93%, respectively. Coefficients of variation of slaughter traits ranged from 5.85-17.21%.

The average carcass measurements, standard errors and coefficients of variance in young Brown Swiss bulls are given in Table 2. Carcass length, chest depth, rump length, rump circumference, arm length and arm circumference were 151.52, 63.70, 70.22, 70.37, 59.80 and 52.57 cm, respectively. Coefficients of variation of carcass measurements ranged from 2.4-8.2%.

Correlation coefficients for slaughter characteristics and carcass measurements of young Brown Swiss bulls are shown Table 3 and 4. In general, positive correlation coefficients were detected for slaughter characteristics. Positive correlation coefficients for slaughter characteristic were high and significant. Only correlations between heart weight with spleen weight and all of the slaughter traits with internal fat weight were negative and not significant. Significant negative correlation coefficients were found between rump length with chest depth, arm length with rump circumference, arm circumference with rump circumference, arm length with arm circumference from carcass measurements.

Table 1: Means (kg), Standard Errors (SE), Coefficients of Variation (CV(%)) for slaughters traits and percentages of slaughter traits to slaughter weight (%) in young Brown Swiss bulls

| Characters | Mean±SE | % | CV (%) |
|---|---|---|---|
| Slaughter weight | 328.40±3.75 | - | 8.85 |
| Hot carcass | 189.02±2.45 | - | 10.04 |
| Chilling carcass | 186.99±1.76 | - | 7.29 |
| Hot dressing percentage | - | 57.56 | 8.21 |
| Chilling dressing percentage | - | 56.93 | 5.85 |
| Skin | 32.40±0.72 | 9.87 | 17.21 |
| Head | 11.92±0.23 | 3.63 | 14.95 |
| Liver | 4.63±0.04 | 1.41 | 6.69 |
| Lung | 2.44±0.03 | 0.74 | 9.52 |
| Heart | 0.90±0.02 | 0.27 | 17.21 |
| Kidney | 0.73±0.01 | 0.22 | 10.61 |
| Spleen | 0.66±0.01 | 0.20 | 11.74 |
| Internal fat | 2.51±0.04 | 0.76 | 12.34 |

Table 2: The average carcass measurements, Standard Errors (SE) and Coefficients of Variance (CV) in young Brown Swiss bulls

| Characters (cm) | Mean±SE | CV (%) |
|---|---|---|
| Carcass length | 151.52±0.46 | 2.4 |
| Chest depth | 63.70±0.49 | 5.9 |
| Rump length | 70.22±0.55 | 6.1 |
| Rump circumference | 70.37±0.74 | 8.2 |
| Arm length | 59.80±0.43 | 5.6 |
| Arm circumference | 52.57±0.31 | 4.6 |

Aksoy *et al.* (2006) reported that the hot dressing percentage for Zavot cattle, local cattle breed of Turkey, slaughtered at approximately 327 kg live-weight was 58.23%. The hot dressing percentage of Zavot cattle was somewhat higher than the result of the present study. Ozluturk *et al.* (2004) reported that the hot dressing, head, skin percentages and pelvic fat weight for Native Eastern Anatolian red males slaughtered at approximately 260 kg live-weight were 55.11, 3.99, 8.09% and 6.80 kg, respectively. From the values founded for Native Eastern Anatolian red males by Ozluturk *et al.* (2004), hot dressing percentage and skin percentage were lower than the values of the present study, however internal fat was higher than the result of this study and head percentage is similar to the finding of the present study. Kendir *et al.* (1972) noted that the hot dressing percentages for Brown Swiss and Native Gray were 57.4 and 57.3%, respectively. The values reported by Kendir *et al.* (1972) are similar to the results of the present study. Arpacik *et al.* (1984) and Akcan *et al.* (1989) reported that dressing percentage increased with increasing slaughter weight. Cerdeño *et al.* (2006) reported that dressing percentages for young Brown Swiss cattle slaughtered at 200, 250 and 400 kg were 62.1, 63.9 and 61.2%, respectively. Ekiz *et al.* (2005) reported that dressing percentages for young Brown Swiss bulls slaughtered at approximately 474, 526 and 574 kg were 58.6, 58.7 and 58.5%, respectively. Dressing percentages for Brown Swiss reported by Cerdeño *et al.* (2006) and Ekiz *et al.* (2005) was higher than that of young

Table 3: Correlations for slaughter characteristics

| Characters | SW | HCW | CCW | SKW | HW | LIVW | LUW | KIW | HEW | SPW |
|---|---|---|---|---|---|---|---|---|---|---|
| HCW | 0.993*** | | | | | | | | | |
| CCW | 0.993*** | 0.999*** | | | | | | | | |
| SKW | 0.947*** | 0.939*** | 0.939*** | | | | | | | |
| HEW | 1.000*** | 0.993*** | 0.993*** | 0.947*** | | | | | | |
| LIVW | 0.622** | 0.601** | 0.601** | 0.536** | 0.623** | | | | | |
| LUW | 0.999*** | 0.993*** | 0.993*** | 0.946*** | 0.999*** | 0.615** | | | | |
| KIW | 0.750*** | 0.729*** | 0.729*** | 0.662** | 0.750*** | 0.491** | 0.753*** | | | |
| HEW | 0.037 | 0.031 | 0.031 | 0.060 | 0.036 | 0.131 | 0.031 | 0.002 | | |
| SPW | 0.270* | 0.273* | 0.273* | 0.295* | 0.270* | 0.022 | 0.277 | 0.379** | -0.117 | |
| IFW | -0.057 | -0.057 | -0.057 | -0.122 | -0.057 | 0.064 | -0.051 | 0.106 | -0.311 | -0.032 |

***p<0.001, **p<0.01; *p<0.05; SW: Slaughter Weight; HCW: Hot Carcass Weight; CCW: Chilled Carcass Weight; SKW: Skin Weight; HW: Head Weight; LIVW: Liver Weight; LUW: Lung Weight; KIW: Kidney Weight; HEW: Heart Weight; SPW: Spleen Weight; IFW: Internal Fat Weight

Table 4: Correlations for carcass measurements

| Characters | CL | CD | RL | RC | AL |
|---|---|---|---|---|---|
| CD | 0.161 | | | | |
| RL | 0.098 | -0.313* | | | |
| RC | -0.192 | -0.205 | 0.143 | | |
| AL | -0.114 | -0.137 | -0.168 | -0.367** | |
| AC | -0.093 | -0.013 | -0.033 | 0.397** | -0.372** |

**p<0.01; *p<0.05; CL: Carcass Length; CD: Chest Depth; RL: Rump Length; RC: Rump Circumference; AL: Arm Length; AC: Arm Circumference

Brown Swiss bulls in the present study. Kendir *et al.* (1972) reported that dressing percentage for Brown Swiss breed was 57.4%. The dressing percentage obtained in the present study was similar to that reported by Kendir *et al.* (1972).

Cerdeño *et al.* (2006) reported that internal fat contents for young Brown Swiss cattle slaughtered at 200, 250 and 400 kg were 6.5, 9.3 and 14.7 kg, respectively. Cerdeño *et al.* (2006) reported that the higher internal fat content in 400 kg group as compared to that in 200 and 250 kg groups was more likely derived from the increase in slaughter weight rather than the feeding strategy. Internal fat contents reported by Cerdeño *et al.* (2006) are inconsistent with the finding of the present study. However, internal fat content is widely in agreement with the value (2.79 kg) obtained for Czech Pied bulls of Barton *et al.* (2003). Aksoy *et al.* (2006) reported that skin, head, spleen, lungs and liver weights increased with increasing slaughter weights. Ulusan *et al.* (1996) reported that skin weight for Brown Swiss bulls slaughtered at 2 years old was 27 kg. This value was lower than the value obtained in this study. Fayyaz *et al.* (2004) reported that the average values for percentage of head to total live weight were 3.64 in Simmental crossbreed male and 3.77 in Brown Swiss crossbreds male. Ozluturk *et al.* (2006) reported that the average value for percentage of head to total live weight was 3.7 in Eastern Anatolian red cattle. The percentage of head obtained in this study was similar to the values reported by Fayyaz *et al.* (2004) and Ozluturk *et al.* (2006). The percentage of skin obtained in the present study was lower than the values (11.52 and 10.87%) reported for Simmental Crossbred and Brown Swiss crossbred males by Fayyaz *et al.* (2004). The difference may be due to the genotype. The difference of 0.63% between hot and chill carcass percentages observed in the present study is somewhat lower than the value (0.8%) reported for Holstein bulls at approximately 2 years old by Odabasioglu *et al.* (1997). Statistically significant correlations between slaughter characteristics and carcass measurements in Zavot cattle were reported by Aksoy *et al.* (2006). Correlations observed for slaughter characteristics in the present study are in agreement with the results of Aksoy *et al.* (2006).

## CONCLUSION

Overall, the results of the present study suggest that young Brown Swiss bulls can be used in beef production in semi-intensive system and carcass evaluation on different slaughtering weights in different breeding systems can be recommend.

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