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The Effect of Initial Age of Fattening on the Fattening Performance and Carcass Traits of Eastern Anatolian Red Cattle Reared in Eastern Turkey

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Abstract: The effects of two different initial ages of fattening on the weight gain, feed intake and feed efficiency characteristics as well as carcass and non-carcass components of the native Eastern Anatolian Red cattle raised in Eastern region of Turkey were studied in this research. According to the age at the beginning of the fattening, 61 EAR male cattle was allocated into two age treatment groups named as group I (9-14 months of ages) and group II (17-22 months of ages). Total weight gain throughout the fattening was numerically greater in younger group compared with the elderly group, however, the difference was not statistically significant. Total dry alfalfa hay and concentrate intake as dry matter did not differ significantly between age groups. However, feed efficiency ratios were significantly ($p<0.01$) influenced by initial age of the fattening in favour of younger EAR cattle. Carcass cutability and yield grade values of the EAR cattle in group I did not differ significantly from those in group II. Overall results of the study revealed that as initial age of the fattening lowers, fattening performance and feed efficiency ratio of EAR male cattle improved, but, carcass quality traits were not adversely influenced.

Key words: Eastern anatolian red, fattening, initial age of fattening, cattle, carcass

INTRODUCTION

Beef production from native breeds is a traditional activity in Eastern Region of Turkey. It makes great contribution to the final national agricultural income. Eastern Anatolian Red (EAR) cattle breed comprises approximately 13.4 % of cattle raised in this country[1]. The indigenous breed has lower growth rate and carcass weight[2]. In addition to the genetic characteristics of the breed, cattle breeders prefer to graze their animals in the free public pastures as long as possible, before these cattle were fattened intensively in the closed barn. This practice results in the raising of initial age of fattening for the cattle. On the other hand, the initial age of fattening which is one of the significant factors influencing profitability and quality of beef carcass is generally neglected in this region[3].

While influences of the initial age of fattening on the performance and carcass traits of exotic breeds reared in Turkey were investigated by several researchers[4-6], there is a study carried out in the Eastern Region of Turkey by Bayindir[7] who compared the fattening performance and carcass characteristics of EAR cattle at 2 and 3 years old. However, there is no research about comparison of the initial fattening ages of the younger EAR cattle reared in this region of the country.

The present study was undertaken with the objective of evaluating the influence of two different initial ages of the fattening on the performance and slaughter, carcass and non-carcass components features of EAR male cattle reared Eastern Region of Turkey.

MATERIALS AND METHODS

A total of 61 male EAR male cattle were allocated to the each of the two different initial age of fattening groups (Group 1 = 9-14 months of ages, Group 2 = 17-22 months of ages). The animals were started on fattening in a closed barn and fed individually throughout the trial. The animals were adapted to the finishing ration over 2 weeks. All animals had *Ad libitum* access to concentrate and dry alfalfa during entire feeding period. Amount of the feed offered was recorded and remained feed in the feeders was weighed daily. The chemical composition of the

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concentrate was 89% dry matter, 14.0% crude protein, 2.5% ether extract, 6.1% crude ash, 12.2% crude cellulose, 54.2% nitrogen free extract. Dry alfalfa contained 91.0% crude protein, 2.0% ether extract, 5.1% crude ash, 26.1% crude cellulose, 57.8% nitrogen free extract. On each of two days at the beginning and end of the fattening period, the animals were weighed after 12 hrs starvation. The average of weights was recorded as the initial and final weights. The experiment lasted for 150 days. Data concerning total weight gain, feed intake and feed efficiency ratio during the finishing phase were obtained.

The EAR cattle were conventionally slaughtered in a commercial abattoir. Head, hide, feet, heart and lungs were removed and weighed immediately following slaughter. Hot carcass weight and some carcass measurements for example carcass length, length of round, thoracic depth, width of the round from medial side and maximum width of the round were measured and recorded[8,9]. The carcasses were chilled at 4°C for 24 hrs. All carcasses were evaluated and scored by two trained carcass evaluators[10]. The area of *Longissimus dorsi* (LD) muscle cross section between 12th and13th ribs, subcutaneous fat thickness over the LD and quantity of kidney and pelvic fat were also determined. The carcasses were evaluated for yield grade and the cutability (percentage of the retail cuts) was determined by using a mathematical equation reported by Boggs and Merkel[11].

The statistical analysis for comparison of means belonging to the two different initial age of the fattening groups was conducted using the Independent Samples T Test procedure of SPSS statistical computer program[12].

RESULTS AND DISCUSSION

Average values for fattening performance traits of EAR cattle at two different age groups are presented in Table 1. Average initial weight of the EAR males in group I was 64.4 kg lower ($p<0.01$) than that of the animals in group II as expected. Final weight of EAR in group I and II were significantly ($p<0.01$) different in favour of group II and average final weight of group I and II were 283.4 and 333.1 kg, respectively. Total weight gain made all through the experiment was numerically higher (14 kg) in younger group compared with the elderly group, however, the difference was not statistically significant (Table 1). Similar results were reported by[13] who indicated that total weight gain of EAR in the younger group were higher than that in older group. The finding is also in accordance with findings of Yanar *et al.*[4] and Altunas and Arpacik[6].

Total dry alfalfa hay and concentrate intake as a dry matter did not differ significantly between age groups. On the other hand, dry alfalfa hay, concentrate as well as total feed intakes per kg weight gain were significantly ($p<0.01$) influenced by initial age of the fattening in favour of younger EAR cattle (Table 1). The result is comparable with findings of[5] who reported that forage ($p<0.05$), concentrate and total feed intakes per kg weight gain were better for younger animals compared with older ones.

Averages for slaughter and carcass traits from EAR cattle in group I and II are presented in Table 2. Means for slaughter weight as well as hot and cold carcass weights of EAR cattle in older group (II) were significantly heavier ($p<0.01$) than those of younger cattle. The result is supported by Bayindir[7] who indicated a trend toward greater carcass weight of elderly EAR. Dressing percentage was not significantly affected by the initial age of the fattening and the average value of the dressing percentage is 56.8 %. The result is comparable with findings of[14,2].

Comparing measurements of fatness, such as average subcutaneous fat thickness over LD muscle, amount of pelvic and kidney fat indicated no significant differences between the group I and II. However, percentage of kidney and pelvic fat was significantly ($p<0.01$) affected by the age groups and older age group had higher percentage of kidney, pelvis and heart fat than younger group (Table 2). The result was in accordance with finding of Bayindir[7].

The male EAR cattle in group II had numerically higher cutability and lower yield grade than those in group I. But, the difference was not statistically significant (Table 2). EAR cattle in group I demonstrated a trend toward smaller LD area than those in group II. The results were supported by Bayindir[7].

Front and hind feet, lungs + heart and spleen weights as a percentage of slaughter weight of EAR in group I and II were significantly ($p<0.01$) higher in favour of younger group (Table 3). The findings were in agreement with results of Tüzemen[5].

Most of the carcass measurements except for length of round were affected significantly ($p<0.01$) by the initial age of the fattening (Table 4). Elderly EAR males had longer carcass length, thoracic depth, width of the round from medial side and maximum width of the round than those in group I. For carcass length, thoracic depth, width of the round from medial side and maximum width of the round, EAR males in group II exceeded those in group I by 12.2, 22.8, 8.9 and 8.9 %, respectively.

Overall results of the study revealed that as initial age of the fattening lowers, fattening performance and feed efficiency ratio of EAR male cattle improved, but, carcass quality characteristics were not adversely influenced. Therefore, it could be suggested that the farmers in the Eastern Region of Turkey should prefer younger EAR cattle in stead of older ones for fattening.

Table 1: Means with standard errors for fattening performance traits

	N	Group I	N	Group II	S
Initial weight (kg)	33	136.5±3.4	28	200.9±4.5	**
Final weight (kg)	33	283.4±5.9	28	333.1±7.8	**
Total weight gain (kg)	33	144.6±5.7	28	130.6±7.5	NS
Total feed intake (kg)	33	1014.0±56.4	28	1133.3±59.4	NS
Consumption of concentrate per kg weight gain	33	5.6±0.1	28	6.9±0.2	**
Consumption of hay per kg weight gain	33	1.3±0.1	28	1.8±0.1	**
Overall feed efficiency ratio	33	6.9±0.2	28	8.7±0.3	**

Group I : 9-14 months of age, Group II : 17-22 months of age, S: Significance, ** : p<0.01, NS: Non-significant

Table 2: Means with standard errors for slaughter and carcass characteristics

	N	Group I	N	Group II	S
Slaughter weight	30	286.8±6.3	28	334.7±8.3	**
Hot carcass weight	30	163.8±4.8	28	191.2±6.3	**
Cold carcass weight	30	156.6±4.5	18	193.2±7.5	**
Dressing (%)	30	56.8±0.5	28	56.8±0.7	NS
Percentage of retail cuts (%)	29	52.4±0.4	27	53.0±0.4	NS
Yield grade	29	1.9±0.1	27	1.7±0.1	NS
LD area (cm^2)	24	60.8±2.5	27	62.6±2.9	NS
Fat thickness over LD (mm)	24	8.0±0.8	27	9.5±0.9	NS
Kidney fat (kg)	30	5.18±0.27	27	5.15±0.35	NS
Pelvic fat (g)	30	613±39	27	675±56	NS
Kidney+pelvic fat (%)	30	3.5±0.1	27	2.9±0.1	**

Group I: 9-14 months of age, Group II: 17-22 months of age, S: Significance, **: p<0.01, NS: Non-significant

Table 3: Means with standard errors for proportions of non-carcass components (out of 100)

	N	Group I	N	Group II	N
Hide (%)	23	7.2±0.2	18	7.2±0.3	NS
Head (%)	23	3.7±0.1	18	3.6±0.1	NS
Front+Hind feet (%)	23	1.6±0.1	18	1.4±0.1	**
Heart+lung (%)	30	1.0±0.1	14	1.5±0.1	**
Spleen (%)	23	1.8±0.1	14	1.8±0.1	NS

Group I: 9-14 months of age, Group II: 17-22 months of age, S: Significance, **: p<0.01, NS: Non-significant

Table 4: Means with standard errors for carcass measurements (cm)

	N	Group I	N	Group II	S
Carcass length	30	131.6±2.6	28	148.1±3.1	**
Length of round	30	68.8±0.9	28	68.3±0.8	NS
Thoracic depth	30	42.7±1.4	28	52.5±2.3	**
Maximum width of the round	30	35.0±0.5	28	37.1±0.8	*
Width of the round from medial side	30	18.5±0.3	24	20.2±0.4	**

Group I: 9-14 months of age, Group II: 17-22 months of age, S: Significance, *: p<0.05, **: p<0.01, NS: Non-significant

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