Effect of initial weight on feedlot local breed cattle performance in the Mediterranean conditions

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ABSTRACT
This study was aimed to investigate the effects of initial weight and the performance of local breeds in feedlot in the Mediterranean conditions. Fifty eight (58) animals from two local breeds (Boz and Gak) were allocated into three groups according to their liveweights. The liveweights of animals ranged from 150 to 200 kg in Group 1, from 200 to 250 kg in Group 2, and from 250 to 300 kg in Group 3.

The performance of the animals was not affected by the initial weight, however Boz breed animals performed better than Gak breed. Although the effect of initial weight on feedlot performance was not significant (P>0.05), the results of this study may have practical and economical importance in terms of decision making process that in feedlot conditions it would be more profitable to start feedlot with the cattle weighing between 200-250 kg.

Key words: beef cattle, feedlot, initial weight, performance,

INTRODUCTION
Fattening of beef cattle has been considered for the last decade as a legitimate husbandry tool in the Mediterranean region of Turkey in certain circumstances but as with all intensive animal husbandry systems, proper management standards need to be operated, otherwise the performance of animals can be affected.

In order to increase profitability in feedlot one should optimize production efficiency and marketing time. One way of increasing production efficiency is to take initial weight into consideration because initial weight is one of the important factors affecting feedlot cattle performance and profitability (Koknaroglu et al., 2006). Both age and starting weight have dramatic, predictable effects on dry matter intake of feedlot cattle.

There are no many published reports on feedlot performance of local breed in the Mediterranean conditions. Keane et al. (1989) and Keane and More O’Ferrall, (1992) pointed out some results on breed comparisons indicating that differences in factors such as production systems, slaughter weights and climate
conditions are of huge importance. The objective of this study was to determine the effects of initial weight upon the performance of local breeds carried out in a feedlot production system in the Mediterranean environment.

**MATERIAL AND METHODS**

*Animals*

The study involved a total of 58 local beef animals and was conducted at Suleyman Demirel University Research Farm in Isparta, Turkey. It included 11 Boz, and 47 Gak local breed animals with a mean initial weight of 210 and 224 kg respectively. The animals were divided into three initial weight groups: Group 1, liveweights ranging from 150-200 kg; Group 2, 200-250 kg; Group 3, 250-300 kg. Each group included both breeds of cattle, 12, 36 and 10 animals with mean weights of 182, 224 and 267 kg in Groups 1, 2 and 3, respectively.

*Animal Management*

The experiment lasted for 210 days. Animals were approximately six months old, and were kept in feedlots into 3 pens. Animals were weighed at the beginning of the experiment and divided into groups according to their weights. Each group was weighed and monitored on a monthly basis.

*Diets*

Each group were provided with corn silage, barley, barley straw, dried sainfoin as roughages, and crushed barley and sunflower meal as concentrates to obtain a target LWG of 1 kg/day and designed according to liveweight change of the animals. Animals had a full access to water throughout the experiment. Chemical compositions of the diets are shown in Table 1.

<table>
<thead>
<tr>
<th>Diets</th>
<th>DM g/kg</th>
<th>CP/kgDM</th>
<th>ME, MJ/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barley</td>
<td>900</td>
<td>110</td>
<td>13.7</td>
</tr>
<tr>
<td>Corn silage</td>
<td>900</td>
<td>80</td>
<td>14.2</td>
</tr>
<tr>
<td>Molasses</td>
<td>750</td>
<td>77</td>
<td>12.9</td>
</tr>
<tr>
<td>Sunflower meal</td>
<td>900</td>
<td>300</td>
<td>10.4</td>
</tr>
<tr>
<td>Barley straw</td>
<td>880</td>
<td>24</td>
<td>5.7</td>
</tr>
<tr>
<td>Dried Sainfoin</td>
<td>880</td>
<td>158</td>
<td>9</td>
</tr>
</tbody>
</table>

DM = Dry Matter, CP = Crude Protein, ME = Metabolic Energy

*Statistical Analysis*

The data were statistically analysed for the effect of initial weight and breed types by GLM (General Linear Model) procedure in Minitab v.14 (Minitab, 2001), using the following model:
\[ Y_{ij} = \mu + \alpha_i + \beta_j + \epsilon_{ij} \]

where \( Y_{ij} \) is the \( ij \)th observation of animal weight,
\( \mu \) is the overall mean,
\( \alpha_i \) is the effect of initial weight,
\( \beta_j \) is the effect of breed type,
\( \epsilon_{ij} \) is the residual effect or random error associated with the individual animal. The significance of differences between group means were examined using Scheffé's pair-wise comparison test.

**RESULTS AND DISCUSSION**

The least-square means and standard errors for liveweights according to the initial weight groups and breed types are shown in Table 2.

<table>
<thead>
<tr>
<th>Initial Weight</th>
<th>N</th>
<th>AIW (kg)</th>
<th>s.e.</th>
<th>FW (kg)</th>
<th>s.e.</th>
<th>TWG (kg)</th>
<th>s.e.</th>
<th>DLWG (kg)</th>
<th>s.e.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Groups</strong></td>
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<td></td>
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<tr>
<td>Group 1</td>
<td>12</td>
<td>182a</td>
<td>4.7</td>
<td>309a</td>
<td>7.9</td>
<td>126a</td>
<td>6.6</td>
<td>0.600a</td>
<td>0.031</td>
</tr>
<tr>
<td>Group 2</td>
<td>36</td>
<td>223b</td>
<td>2.1</td>
<td>363b</td>
<td>5.4</td>
<td>138a</td>
<td>4.5</td>
<td>0.661a</td>
<td>0.021</td>
</tr>
<tr>
<td>Group 3</td>
<td>10</td>
<td>264c</td>
<td>3.9</td>
<td>405c</td>
<td>9.8</td>
<td>140a</td>
<td>8.1</td>
<td>0.671a</td>
<td>0.038</td>
</tr>
<tr>
<td><strong>Breeds</strong></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Boz</td>
<td>11</td>
<td>210a</td>
<td>8.4</td>
<td>370a</td>
<td>8.8</td>
<td>145a</td>
<td>7.3</td>
<td>0.690a</td>
<td>0.034</td>
</tr>
<tr>
<td>Gak</td>
<td>47</td>
<td>224a</td>
<td>4.1</td>
<td>350b</td>
<td>4.5</td>
<td>125b</td>
<td>3.7</td>
<td>0.600b</td>
<td>0.017</td>
</tr>
</tbody>
</table>

AIW= Average Initial Weight, FW= Final Weight, TWG= Total Weight Gain, DLWG= Daily Liveweight Gain, s.e.= standard error
* The means with the same superscripts within the same columns are not statistically significant (P >0.05).

There were significant (P <0.05) differences between groups and breed types for FW. However, they were not statistically significant for TWG and DLWG. Boz cattle performed better than Gak cattle in all observed parameters. When all animals reached the final weight, the weight of the Group 2 was 54 kg greater than Group 1 and 42 kg less than Group 3. TWGs were 126, 138 and 140 kg for Groups 1, 2 and 3 respectively. As shown in Table 2 the animals in Group 1 and 2 had almost similar TWGs which indicate that the best ideal starting weight range for feedlot is between 200-250 kg (Group 2). At the end of the experiment, the animals in Group 2 had 12 kg more in total weight gain than Group 1 and only 2 kg TWG less than Group 3 although these differences were not statistically significant (P > 0.05). However, such differences could have practical importance in terms of profitable feedlot beef cattle production. Furthermore, in respect to comparison between the two local breeds used in feedlot production systems, Boz type of breed had 20 kg TWG greater than Gak type breed animals when carried out in the Mediterranean conditions. Funston *et al.*
al. (2003) pointed out that for every kilogram in initial body weight, final weight increased by 1.06 kg; even carcass weight and carcass grade were positively affected by initial body weight. DLWGs were 0.600, 0.661 and 0.671 kg/day, for Groups 1, 2 and 3 respectively. However, these values were not statistically significant (P >0.05). This was in agreement with the study of Funston et al. (2003) showing that initial weight did not affect DLWG and was not correlated with it. DLWG values were 0.690 and 0.600 kg/day and were statistically significant (P <0.05) for Boz and Gak breeds respectively. Koknaroglu et al. (2006) reported that lighter group of cattle tended to be more efficient and required less feed per kilogram of gain.

Conformation and growth potential vary greatly between different breeds of cattle. While there are certainly differences between breeds in growth rate, the liveweight gain which can be achieved from a given quantity of feed is similar for most breeds, provided that each breed is fed and managed according to its own particular requirements (Wilkinson, 1985; Bozkurt and Ap Dewi, 1996). However, in this study the intake was not measured. There is certainly a strong relationship between feed intake and animal performance regardless of their breed types. There are also clearly other breed-related factors that are involved in growth performance of animals. Taylor et al. (1986) compared cattle of 25 different beef and dairy breeds and indicated that weight accounts for 88% of the variation in feed intake within a given breed, but only 14-33% of the variation observed from one breed to another. These researchers further observed that the cattle with higher initial weights likely had a higher concentration of the larger breeds. This is supported by the data of Koknaroglu (2005) who observed low, non-significant correlations between initial weight and subsequent rate of gain within breed comparisons of data from various studies.

CONCLUSIONS

Although there was no statistically significant affect of initial weight on feedlot performance of local breed cattle, the results of this study may have practical and economical importance in terms of decision making process that in feedlot conditions it would be more profitable to start feedlot with the cattle weighing between 200-250 kg.

There are no many published reports of local breed comparisons to compare feedlot performance in the Mediterranean conditions. However, Boz breed performed better than Gak cattle. The breed comparison results obtained in this study were based on liveweight but, in order to have comprehensive breed comparisons other measures such as growth rate, FCE, slaughter weight and carcass composition are of important. The results showed that under the Mediterranean conditions, Boz cattle were better suited to the feedlot beef systems than Gak cattle.
REFERENCES


