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Comparison of growing and finishing performance of different breeds of feedlot beef cattle grown under the Mediterranean conditions

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ABSTRACT

This study was aimed to compare the performance of different breeds of beef cattle during both growing (GP) and finishing periods (FP) under the Mediterranean type of climatic zone. Data comprised of total of 106 beef cattle, including Holstein (11), Brown Swiss (27), Simmental (8) cattle as pure bred (PB) and Boz (12) and Gak (48) as local breeds (LB) with initial average weights of 202, 196, 210, 203 and 220 kg respectively.

There were statistically significant ($P< 0.05$) differences in daily liveweight gains (DLWG) of cattle at both GP and FP. While there were no statistically ($P> 0.05$) significant differences in performance between Holsteins (0.90 and 0.68 kg/day for GP and FP respectively), Brown Swiss (0.87 and 0.66 kg/day) and Simmental (0.92 and 0.75 kg/day) cattle and between Boz (0.60 and 0.50 kg/day) and Gak (0.56 and 0.45 kg/day) cattle themselves in both feeding periods, Simmentals tended to perform better than the rest for both periods. The performance of PB cattle was greater than LB cattle in both periods. Overall DLWGs of animals in GP (0.70 kg/day) were statistically higher ($P< 0.05$) than those of FP (0.56 kg/day).

The results indicated that since growing and finishing performance of PB cattle were greater than LB cattle any of the PB cattle could be recommended to the feedlot beef systems under the Mediterranean conditions.

INTRODUCTION

Beef production methods have changed markedly for the last few decades towards more planned beef production systems. The main reason for the change is that the older systems became too demanding in their requirements for land and labour to be economically viable. This has led to intensification, coupled with an increase in the scale of production, or alternatively, to the keeping of the original number of animals in a smaller area, which allows more land to be used for other farming enterprises (King, 1978). It also depends on the size of agricultural holdings and the overall structure of the cattle industry especially the relationship between beef and dairy production (Allen and Kilkenny, 1984).

In Turkey where there is a much smaller range of farming environments divided mainly into smaller farms, beef is produced primarily as a by-product of milk production and the cattle are mainly dual purpose for milk and beef.

In fact, there is still a need for information on the comparative feedlot performance of European breeds with local breeds especially under the Mediterranean climatic conditions.

Therefore, this study was aimed to provide some information on feedlot performance of breeds during growing and finishing periods in the Mediterranean part of the country.

MATERIALS and METHODS

The study involved a total of 106 beef animals, including 11 Holstein, 8 Simmental, 27 Brown Swiss as 46 pure breds (PB) with initial average weights of 202, 196 and 210 kg respectively; 12 Boz, 48 Gak as 60 Local Breeds (LB) with initial average weights of 203 and 220 kg respectively.

The experiment was conducted at the university farm feedlot facilites and lasted for 7 months, first 4 months growing and the rest finishing period. Animals were initially weighed at the beginning of the experiment and were divided into groups according to their weights. Each group was weighed on a fortnightly basis. Animals had full access to water throughout the experiment and were given sugar beet bulb and dried hay as roughage and ground barley and cotton seed meal as concentrates to obtain a target LWG of 1 kg/day and designed according to live weight change of the animals.

The data for breed types were analysed by GLM (General Linear Model) procedure using Minitab software v.14 (Minitab, 2004) by taking initial weight as a covariate in the model. The significance of differences between individual breed means were examined using Scheffé's pair-wise comparison test since there were unequal observation in parameters.

RESULTS and DISCUSSION

The least-square means and standard errors for liveweights for breed types in growing and finishing periods are shown in Table 1 and 2 respectively.

Table 1. Growing performance comparisons of breed types*

Breed Type	N	IW (kg)	s.e.	FW (kg)	s.e.	TWG (kg)	s.e.	DLWG (kg)	s.e.
PB Cattle	***46***	***203^{a}***	***5.7***	***306^{a}***	***7.1***	***103^{a}***	***2.2***	***0.884^{a}***	***0.018***
Holstein	11	202^{ab}	8.3	310^{a}	9.7	108^{a}	3.6	0.902^{a}	0.03
Brown Swiss	27	196^{a}	8.5	300^{a}	10.6	104^{a}	3.3	0.865^{a}	0.03
Simmental	8	213^{ab}	11.9	324^{a}	13.3	111^{a}	3.3	0.923^{a}	0.03
LB Cattle	***60***	***218^{b}***	***4.3***	***287^{b}***	***4.9***	***69^{b}***	***1.9***	***0.570^{b}***	***0.016***
Boz	12	203^{ab}	10.5	275^{a}	12.8	72^{b}	4.9	0.603^{b}	0.04
Gak	48	222^{b}	4.5	291^{a}	5.2	69^{b}	2.1	0.561^{b}	0.02

IW= Initial weight, FW= Final weight, TWG= Total weight gain, DLWG= Daily Liveweight gain

* 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 breed types during growing performance for FW, TWG and DLWG. PB cattle performed better than LB cattle in all parameters observed (DLWG, 0.884 *vs* 0.570 kg/day). However, there were no significant (P>0.05) differences in performance of cattle among the same breed types. Mean daily liveweight gains for Holstein, Brown-Swiss, Simmental, Boz and Gak cattle were 0.902, 0.865, 0.923, 0.603 and 0.561 kg respectively. During growing period, while Simmental tend to perform better than the rest of PB cattle and LB cattle, Boz performed better than Gak within LB cattle.

Table 2. Finishing performance comparisons of breed types*

Breed Type	N	IW (kg)	s.e.	FW (kg)	s.e.	TWG (kg)	s.e.	DLWG (kg)	s.e.
PB Cattle	***46***	***335^{a}***	***7.2***	***396^{a}***	***7.7***	***61^{a}***	***1.4***	***0.681^{a}***	***0.016***
Holstein	11	339^{ab}	9.7	400^{a}	8.9	61^{a}	3.6	0.680^{a}	0.03
Brown Swiss	27	327^{ab}	11.0	386^{a}	11.7	60^{a}	3.3	0.658^{a}	0.02
Simmental	8	356^{a}	13.3	424^{a}	13.1	68^{a}	3.3	0.754^{a}	0.03
LB Cattle	***60***	***309^{b}***	***4.9***	***351^{b}***	***5.5***	***42^{b}***	***1.5***	***0.466^{b}***	***0.017***
Boz	12	300^{b}	13.6	345^{b}	13.9	45^{b}	3.6	0.502^{b}	0.04
Gak	48	311^{ab}	5.2	352^{b}	5.9	41^{b}	1.7	0.456^{b}	0.02

IW= Initial weight, FW= Final weight, TWG= Total weight gain, DLWG= Daily Liveweight gain

* The means with the same superscripts within the same columns are not statistically significant (P >0.05).

Similar to the performance obtained in growing period, there were significant (P<0.05) differences in performance between breed types during finishing period for FW, TWG and DLWG. PB cattle performed better than LB cattle in all parameters observed (DLWG, 0.681 *vs* 0.466 kg/day). However, there were no significant (P>0.05) differences in performance of cattle among the same breed types. Mean daily liveweight gains for Holstein, Brown-Swiss, Simmental, Boz and Gak cattle were 0.680, 0. 658, 0.754, 0.502 and 0.456 kg respectively. During finishing period, while Simmental tend to perform better than the rest of PB cattle and LB cattle, Boz performed better than Gak within LB cattle.

In relation to the comparison of performances of both breed types in two different periods, all breeds performed better in growing period than those in finishing period. These results were in line with statement that breeds and crosses of beef cattle show distinctive differences in size, earliness of maturity and carcass characteristics. Large breeds grow faster than smaller breeds. Early-maturing breeds finish at a faster rate than late-maturing breeds (Wilkinson, 1985). While there are certainly differences between breeds in growth rate, the liveweight gain which can be achieved from a certain quantity of feed is similar for most breeds, provided that each breed is fed and managed according to its own particular requirements (Wilkinson, 1985). However, as indicated in the related literature (Keane *et al.* (1989; Keane and More O'Ferrall, 1992 and Bozkurt and Ap Dewi, 1996) breed comparisons are not necessarily applicable outside the countries where the experiments were carried out due to the differences in factors such as production systems, slaughter weights and climate, etc.

CONCLUSION

The breed comparison results obtained in this study were based on liveweight. In order to have comprehensive breed comparisons other measures such as growth rate, feed conversion efficiency, and carcass and slaughter weight are of important.

The performance of PB cattle was greater than LB cattle in both periods. Overall DLWGs of animals in growing period were statistically higher (P< 0.05) than those of finishing feriods for any type of breeds.

The results indicated that since growing and finishing performance of PB cattle were greater than LB cattle, any of the PB cattle could be recommended to the feedlot beef systems under the Mediterranean conditions.

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