

AN EVALUATION OF FEEDLOT PERFORMANCE OF HOLSTEIN AND BROWN SWISS CATTLE GROWN UNDER MEDITERRANEAN CLIMATE CONDITIONS

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In this study, it was aimed to compare feedlot performance of 26 Holstein and 20 Brown Swiss cattle, (46 in total) grown under Isparta climate conditions. In this experiment, 10–12 months old beef animals were used with an initial weight of 264 and 273 kg Holstein and Brown Swiss, respectively. After the experiment which lasted for 7 months mean final weights of Holstein and Brown Swiss cattle were 535 and 477 kg; mean total weight gains 268 and 209 kg and finally daily liveweight gains of 1.275 and 0.997 kg, respectively. Final weights, total weight gains and daily liveweight gains of Holstein and Brown Swiss cattle and the difference in those parameters between both cattle were statistically significant ($P < 0.05$). In conclusion, Holstein breed cattle performed better than Brown Swiss breed cattle in feedlot beef systems grown under the Mediterranean climate conditions.

Key words: Holstein; Brown Swiss; beef cattle; performance; feed-lot; Mediterranean

ПРОЦЕНА НА ХРАНИДБЕНИТЕ ПЕРФОРМАНСИ КАЈ ХОЛШТАЈН-ФРИЗИСКО И МОНТАФОНСКО ГОВЕДО ОДГЛЕДУВАНИ ВО УСЛОВИ НА МЕДИТЕРАНСКАТА КЛИМА

Целта на ова истражување беше да се споредат хранидбените перформанси на 26 грла од холштајн-фризиската и 20 грла од монтафонската раса крави (вкупно 46), кои се одгледувани во климатски услови карактеристични за областа Испарта. Во овој експеримент беа вклучени грла на возраст од 10–12 месеци, со почетна маса од 264 kg за холштајн-фризиската и 273 kg за монтафонската раса. По експериментот, кој траеше 7 месеци, утврдена е просечната финална маса – кај холштајн-фризиските од 535 kg и кај монтафонските говеда до 477 kg. Просечниот вкупен прираст изнесуваше 268 и 209 kg, додека просечниот дневен прираст изнесуваше 1,275 и 0,997 kg, соодветно. Утврдените разлики во однос на вкупната мас, вкупниот прираст, како и просечниот дневен прираст кај двете раси беа статистички значајни ($P < 0.05$). Како заклучок, одгледувањето на говеда од холштајн-фризиската раса покажа подобри резултати од одгледувањето на монтафонската раса во хранидбените гојни системи во услови на медитеранската клима.

Клучни зборови: холштајн-фризиско говедео; монтафонско говедео; гојни говеда, перформанси; хранилишта; медитеранска клима

1. INTRODUCTION

Beef production constitutes an important sector of the agricultural industry of many countries. The type of beef industry which develops in any country depends largely on climatic conditions and land types. It also depends on the size of agricul-

tural holdings and the overall structure of the cattle industry especially the relationship between beef and dairy production (Allen and Kilkenny, 1984).

Beef production methods have changed markedly since the Second World War 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).

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.

For the last decade, beef producers in Turkey have been facing a big challenge in meeting the great demand for red meat consumption of the population along with its rapid growth rate. Therefore, feedlot beef production systems have gained a big interest due to their low investment and operational costs (Ecevit, 1999).

There is little or no information on the comparative feedlot performance of Holstein cattle breeds with Brown Swiss cattle especially under the Mediterranean climatic conditions. Therefore, this study was aimed to provide some information on feedlot performance comparisons of breeds grown in the Mediterranean part of the country.

2. MATERIALS AND METHODS

Animals

The study was conducted at a commercial beef farm in Gönen, Isparta province, located in the Mediterranean Region of the country. The present study involved a total of 46 beef animals and included 26 Holstein (H) and 20 Brown Swiss (BS) cattle with mean initial weight of 264 kg and 273 kg respectively. All specimens were approximately 10 to 12 months old and were obtained from local cattle markets.

Animal management

Animals were initially weighed at the beginning of the experiment and were randomly divided according to their weights into four groups, each group having the same type of breed and were kept in feedlots with four pens. Each group was weighed and monitored on a fortnightly basis, using electronic weighing scale (True-Test2000 Smart-

Unit). The experiment lasted for 7 months. The free access of the experimental animals to water was available throughout the experimental period.

Diets

Each group was provided with a mixed ration of corn silage (40%), ground barley (18%), barley straw (2%), dried vetch (15%) and wheat wholemeal (5%) as roughages, and crushed barley and sunflower meal as concentrates (20%) to obtain a target LWG of 1 kg/day and designed according to the liveweight change of the animals. The rations were weighed out into bags and fed twice daily. Chemical compositions of the diets are shown in Table 1.

Table 1

Chemical composition of diets

Dry matter %	88	Vitamine A, I.U/kg	10000
Crude protein %	12	Vitamine D3, I.U/kg	2000
Crude fibre %	14	Vitamine E, Mg/Kg	30
Crude ash %	9	Niacin, Mg/Kg	150
Calcium %	1.0–2.0	Mangan, Mg/Kg	50
Phosphate %	0.5	Ferro, Mg/Kg	50
Sodium %	0.3–0.6	Zinc, Mg/Kg	50
Metabolic energy, kcal/kg	2650	Copper, Mg/Kg	10

Statistical analysis

The data for breed types and seasons were analyzed by GLM (General Linear Model) procedure (Minitab v.14), using the following model:

$$Y_{ijk} = \mu + \alpha_i + \beta_j + \varepsilon_{ijk}$$

where

Y_{ijk} is the ijk -th observation of animal weight,

μ is the overall mean,

α_i is the effect of breed type,

β_j is the effect of initial weight,

ε_{ijk} is the residual effect or random error associated with the individual animal.

The breed type factor was fitted as a fixed effect, and the initial weight was included in the

model as a covariate (267 kg approximately). The data were also analyzed by 2-sample Students' t-test since there was no significant difference in the initial weight of both breeds.

3. RESULTS AND DISCUSSION

The least-square means and standard errors for liveweights for breed types are shown in Table 2.

There were significant ($P < 0.05$) differences between breed types in FW, TWG and DLWG. H cattle performed better than BS cattle in all parameters observed. Mean daily liveweight gains for Holstein and Brown-Swiss cattle were 1.275 and 0.997 kg respectively.

Final weights and overall weight gains of Holsteins (535 kg and 268 kg respectively) were

statistically higher ($P < 0.05$) than those of Brown Swiss cattle (477 kg/day and 209 kg respectively).

These results were in line with the statement that breeds and crosses of beef cattle show distinctive differences in size, earliness of maturity and carcass characteristics (Bozkurt and Ap Dewi, 1996). Large breeds grow faster than smaller breeds. Early-maturing breeds finish at a faster rate than late-maturing breeds (Wilkinson, 1985). Conformation and growth potential vary greatly between different breeds of cattle. While there are certainly differences between breeds in the growth rate, the liveweight gain which can be achieved from a given area of grass or quantity of feed is similar for most breeds, provided that each breed is fed and managed according to its own particular requirements (Wilkinson, 1985).

Table 2

Over all performance comparisons of breed types*

Breed type	N	IW (kg)	s.e.	FW (kg)	s.e.	TWG (kg)	s.e.	DLWG (kg)	s.e.
Holstein	26	264 ^a	4.69	535 ^a	5.463	268 ^a	5.463	1.275 ^a	0.034
Brown Swiss	20	273 ^a	7.34	477 ^b	6.239	209 ^b	6.239	0.997 ^b	0.021

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 ($P > 0.05$).

The superior weights of Holstein cattle in this study were in agreement with the results of Bozkurt (2006 and 2007). The results showed that under the Mediterranean conditions Holstein cattle were better suited to the feedlot beef systems than Brown Swiss cattle.

However, as Keane *et al.* (1989) and Keane and More O'Ferrall, (1992) pointed out the results of these comparisons, including those reported in this study 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.

4. CONCLUSION

It can be concluded that the breed comparison results obtained in this study were based on

liveweight. However, in order to have comprehensive breed comparisons, other measures such as growth rate, FCE, seasonal variation of climate, different management practices and carcass and slaughter weight are important.

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