PERFORMANCE OF BEEF CATTLE GROWN ON AN ARTIFICIAL PASTURE OVER TWO CONSECUTIVE YEARS UNDER THE MEDITERRANEAN CONDITIONS

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Turkey has 12.5 million hectares of rangeland, many of which have deteriorated due to intensive livestock grazing. The most important problem of raising livestock is the shortage of feed stuff and in fact only one-third section of needed forage can be supplied in Turkey. Often supplementary feed is required to compensate animals for pasture deficiencies. One of the ways to resolve the lack of roughage was to establish artificial pastures. Artificial pasture establishment increased in recent years in Turkey. The commonly used species in establishing artificial pasture in Turkey is crested wheatgrass, smooth bromegrass and alfalfa (**Acar et al.,** 2011). Flora, stage of maturity, soil composition, climate, altitude and other managerial factors affect the physical and chemical properties of grassland (**Church**, 1991; **Holmes**, 1994; **McDonald et al**., 1995).

The stage of growth seems to be the most important factor affecting the chemical composition and digestibility of range forage. In general, all forages are highly succulent and palatable in early growth. The objectives of this study were to examine the pastures artificially established in the Mediterranean region in terms of stage of maturity, quality, yield and botanical composition.

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).

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 (**Allen and Kilkenny**, 1984).

Therefore, the objective of this study was to determine the performance of Holstein breed beef animals grown on an artificially established pastures over two consecutive years under the Mediterranean climate conditions.

MATERIAL AND METHODS

Experimental Location

This study was carried out in Isparta Province (37°45′N, 30°33′E, elevation 1035 m) located in the Mediterranean region of Turkey on two consecutive years of 2011 and 2012. Total precipitation as a long-term average for both years was 450 mm. Average temperature was 12.1 ºC for both years.

Animals

The experiment was set up at Suleyman Demirel University Research Farm and lasted for 90 and 70 days for the years 2011 and 2012 respectively and involved a total of 40 Holstein beef cattle with an average 6 months old and each year 20 Holstein beef animals were used in this experiment with an initial weight of 184 and 232 kg for the first and the second year experiments respectively.

Animal and Pasture Management

Animals were initially weighed at the beginning of the experiments and were randomly divided according to their weights into two grazing groups. Each group was weighed and monitored on a fortnightly basis, using electronic weighing scale (True-Test 2000 SmartUnit). The free access of the animals to water was available throughout the experimental period.

For the establishment of artificial grazing land, 3 ha pasture land was chosen adjacent to the university farm and cultivated in March 2010 with two different botanical compositions. Pasture 1 (P1) was composed

of *Medicago sativa* L. (20%) + *Bromus inermis* L. (40%) + *Agropyron cristatum* L. (30%) + *Poterium sanguisorba* (10%); and Pasture 2 (P2) had mixtures of *Medicago sativa* L. (15%) + *Onobrychis sativa* Lam. (15%) + *Agropyron cristatum* L. (35%) + *Bromus inermis* L. (35%), respectively..

In order to monitor chemical composition changes in pastures, grass samples were collected by using $1m^2$ quadrates fortnightly from May to August each year. The fresh biomass (FB) yield, dry matter (DM) yield, crude protein (CP), acid detergent fibre (ADF) and neutral detergent fibre (NDF) contents were determined as well.

Statistical Analysis

General Linear Model (GLM) procedure was used for the statistical analysis of the data by using Minitab.16 statistical software programme and initial weight and age were taken as covariates to eliminate the weight and age differences at the start of the experiment.

$$Yijk = \mu + \alpha i + \beta j + \varepsilon ijk$$

where *Yijk* is the *ijk* th observation of animal weight,

μ is the overall mean,

αi is the effect of treatments,

βj is the effect of initial weight and,

εijk is the residual effect or random error associated with the individual animal

RESULTS AND DISCUSSION

As it is presented in Table 1, final weights of the animals in the years 2011 and 2012 were 282 and 322 kg; the average total weight gains 98 and 90 kg and finally daily liveweight gains of 1.089 and 0.983 kg respectively. Similarly, in respect to performance of animals in pasture types, the final weights were 103 and 303 kg for P1 and P2 respectively. The average total weight gains 95 and 91 kg and finally daily liveweight gains of 1.059 and 1.014 kg respectively.

There were no significant (P>0.05) differences between years and pasture types in FW, TWG and DLWG. However, the animals in 2011 and in P1 tended to perform better than the cattle in 2012 and in P2 in all parameters observed. There were also no statistical differences in chemical compositions of grasses in both pastures.

In literature, there are no many published studies on performance of different breeds and comparison on different beef production systems in the Mediterranean conditions. However, **Bozkurt** (2007 and 2012) reported about the superior performance of Holstein cattle compared to other some local and European breed cattle and concluded that under the Mediterranean conditions Holstein cattle were better suited to the feedlot beef systems than other local and some European type cattle.

The results showed that there were no effects of the years and the pasture types on the performance of the animals. **Keane et al.** (1989) and **Keane and More O'Ferrall**, (1992) reported some results on breed comparisons indicating that differences in factors such as production systems, slaughter weights and climate conditions are of great importance. Similarly, it was stated that breeds and crosses of beef cattle show distinctive differences in performance in different production systems (**Bozkurt and Ap Dewi**, 1996). Performance potential vary greatly between different breeds of cattle and different production systems. While there are certainly differences between performance of

Table 1. **Overall performance comparisons of animals by years and pasture types***

Years	N	IW (kg)	s.e.	FW (kg)	s.e.	TWG (kg)	s.e.	DLWG (kg)	**s.e.**
2011	20	184	6.20	282	7. 40	98[a]	2.43	1.089[a]	0.027
2012	20	232	13.0	322	11.0	90[a]	4.56	0.983[a]	0.051
Pastures									
P1	20	206	10.8	301	10.1	95[a]	4.08	1.059[a]	0.045
P'	20	212	12.3	303	10.7	91[a]	3.48	1.014[a]	0.039

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

* The means with the same superscripts presented in the table are not statistically significant (P >0.05).

animals in growth rate, the liveweight gain which can be achieved from a given area of grass or quantity of feed is similar for most breeds of animals, provided that animal is fed and managed according to its own particular requirements in its own environment (**Wilkinson**, 1985).

The results of these comparisons, including those reported in literature are not necessarily applicable outside the countries where such experiments were carried out due to the differences in factors such as production systems, slaughter weights and climate, etc.

CONCLUSION

Consequently, since there were no differences in performance of animals and chemical composition of pastures between years, both type of artificial pastures can be recommended for beef cattle production in the region.

REFERENCES

1. **Acar, R., M. Demiryürek, M. Okur and S. Bitgi,** 2011. An investigation of artificial pasture establishment under dryland conditions. African Journal of Biotechnology Vol. 10(5), pp. 764-769**.**

2. **Allen, D., Kilkenny, B.**,1984. Planned Beef Production, Collins, London.

3. **Bozkurt, Y.,** 2006. Seasonal performance of different breeds of feedlot beef catle grown under the Mediterranean conditions. EAAP, European Association for Animal Production 57 th Annual Congress, Antalya, Turkey.

4. **Bozkurt, Y., 2012**. Seasonal Performance of Different Breeds of Feedlot Beef Cattle Grown Under the Mediterranean Conditions. Bulgarian J. Agric. Sci., Vol. 18, No. 3; pp. 443-445.

5. **Bozkurt, Y., Ap Dewi, I.,** 1996. Effect of Breed Type, Sex, Birth Year and Season of Birth and Their Interactions on Liveweight Change in Beef Cattle. Selcuk Univ. J. Agric. Fac. Vol. 10, No. 13; pp. 125-140.

6. **Church, D. C.,** 1991. Roughages, Livestock Feeds and Feeding, New Jersey, Simon and Schuster, 56-68, 1991.

7. **Ecevit, F.,** 1999. Açıkta sığır besisi paneli, 25 Kasım 1999, Süleyman Demirel Üniversitesi Ziraat Fakültesi, Isparta, pp. 3-6.

8. **Holmes, W**., 1994. Grass: Its Production and Utilization, London, The British Grassland Society, Blackwell Scientific Publications, 1994.

9. **Keane, M. G., More O'ferrall, G. J**., 1992. Comparison of Friesian, Canadian Hereford × Friesian steers for growth and carcass composition. Anim. Prod., Vol. 55, pp. 377-387.

10. **Keane, M. G., More O'ferrall, G. J., Connoly, J.,** 1989. Growth and carcass composition of Friesian, Limousin × Friesian and Blonde Daqutaine × Friesian steers. Anim. Prod. Vol. 48, pp. 353-365.

11. **McDonald, P., Edwards, R. A., Greenhalgh, J. F. D., Morgan, C. A.,** 1995. Grass and Forage Crops, Animal Nutrition, England Longman Scientific and Technical, 434-444.

12. **Wilkinson, J. M**., 1985. Beef Production from Silage and Other Conserved Forage. Longman Group Limited, London and Newyork, pp. 128.

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SUMMARY

This study was aimed to determine the performance of Holstein breed beef animals grown on an artificially established pastures over two consecutive years under the Mediterranean climate conditions. The experiment was conducted at university farm in Isparta province located in the west Mediterranean region of Turkey on two consecutive years (2011 and 2012). For this purpose, 20 Holstein breed beef cattle with an average of 6 months

old were assigned equally to two grazing paddocks established as a 3 ha-artificial pastures. Pasture 1 (P1) was composed of *Medicago sativa* L. (20%) + *Bromus inermis* L. (40%) + *Agropyron cristatum* L. (30%) + *Poterium sanguisorba* (10%); and Pasture 2 (P2) had mixtures of *Medicago sativa* L. (15%) + *Onobrychis sativa* Lam. (15%) + *Agropyron cristatum* L. (35%) + *Bromus inermis* L. (35%), respectively. The first year experiment lasted for 90 and the following year 70 days.

The results showed that there were no effects of the years and the pasture types on the performance of the animals. The total weight gains of the animals were 98 and 90 kg at the end of the first year grazing and the second year respectively. Daily liveweight gains (DLWG) of the animals were as follows: 1.089 *v*. 0.983 kg, respectively. Similarly, the total weight gains of the animals grazed on P1 and P2 were 95 and 91 kg respectively. DLWGs were 1.059 and 1.013 kg for P1 and P2 respectively. Consequently, both type of artificial pastures can be recommended for beef cattle production in the region.

Key words: *Holstein, Artificial Grassland, Performance, Beef Production*

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