

The Effect of Initial Live Weight on Technical and Economic Performance in Cattle Fattening

Yavuz CEVGER, Hakan GÜLER, Savaş SARIÖZKAN, Hasan ÇİÇEK
Department of Livestock Economics, Faculty of Veterinary Medicine, Ankara University, Ankara - TURKEY

Received: 30.05.2002

Abstract: This research was carried out to assess cattle fattening activity between October 1999 and March 2000 in terms of its technical and economic aspects.

The data of 138 days' fattening in 54 male Brown Swiss hybrid (F₁) cattle of about 20-22 months old form the material of the research. The cattle whose initial live-weights were up to 200 kg were defined as Group I, those between 201 and 250 kg as Group II and those over 251 kg as Group III.

The lowest value in the average live-weight costs per unit was found in Group I. The partial productivity of feed in terms of dry matter content was 0.15 kg. The partial productivity of labor was 37.20 kg/d. The financial profitability ratio was 37.34%. The price margin of the whole herd was 18.71% and the weight margin was 81.29%.

In conclusion, it was determined that the animals with low initial live-weights had a higher fattening performance in terms of economic values and technical evaluation criteria, with the exception of daily live-weight gain per animal.

Key Words: Cattle fattening, profitability, productivity, cost, price margin, weight margin

Sığır Besiciliğinde Besi Başı Canlı Ağırlığının Teknik ve Ekonomik Besi Performansına Etkisi

Özet: Bu araştırma, Ekim 1999-Mart 2000 arası dönemde yürütülen bir sığır besisi faaliyetinin, teknik ve ekonomik yönden değerlendirilmesi amacıyla yapılmıştır.

Araştırmanın materyalini, 20-22 aylık yaşlarda, 54 baş erkek Montofon melezi (F₁) sığırlarla yapılan 138 günlük besiyeye ait kayıtlar oluşturmaktadır. Çalışmada; besi başı canlı ağırlığı 200 kg ve daha az olan sığırlar I. Grup; 201-250 kg arası olanlar II. Grup; 251 kg ve üzeri olanlar ise III. Grup olarak tanımlanmışlardır.

Araştırmada birim başına ortalama canlı ağırlık maliyetlerinde en düşük değer I. Grup'ta bulunmuştur. Kuru madde cinsinden yem kısmi verimliliği 0,15 kg; işçilik kısmi verimliliği ise 37,20 kg/gün olarak hesaplanmıştır. Mali rantabilite rasyosu % 37,34 olarak tespit edilmiştir. Tüm sürüye ait fiyat marjı % 18,71; ağırlık marjı ise % 81,29 olarak hesaplanmıştır.

Sonuçta araştırmada besi başı canlı ağırlığı düşük olan hayvanların, hayvan başına günlük canlı ağırlık artışı dışındaki teknik değerlendirme kriterleri ve ekonomik değerler açısından daha yüksek bir besi performansı gösterdikleri tespit edilmiştir.

Anahtar Sözcükler: Sığır besiciliği, kârlılık, verimlilik, maliyet, fiyat marjı, ağırlık marjı

Introduction

The importance of meat export possibilities in terms of the national economy, besides the increase in meat production and consumption and improvement of quality have always attracted the attention of the public and state administrators. However, the lack of professional and educational knowledge among animal producers and livestock breeders, the conventionalism in live animal and meat marketing, and the imbalance between feed and meat prices prevent fattening in the Turkey reaching the level in developed countries in terms of economic and rational enterprises (1,2).

The objective of this research is to set out the profitability and productivity situation and to assess the obtained results with inter-group comparisons by determining the enterprise consequences of the fattening activity realized by groups formed according to initial live-weights.

Materials and Methods

Materials

Data on fattening activity was collected under the supervision of the Ankara University Faculty of Veterinary

Medicine by a private entrepreneur at the Cattle Fattening Unit of the Training, Research and Practice Farm of the Faculty of Veterinary Medicine between October 1999 and March 2000 from 54 male Brown Swiss hybrid (F₁) cattle of about 20-22 months old.

Methods

The cattle to be fattened were weighed before feeding for 2 consecutive days after a resting period of 1 day; the average of the two weights was regarded as the initial fattening live-weight. The cattle were grouped according to these determined live-weights. According to this, cattle whose initial live-weights were up to 200 kg were defined as Group I, those between 201 and 250 kg as Group II and those over 251 kg as Group III. Fourteen, 31 and 9 head of cattle were added to the groups, respectively. The weighing processes were later continued once every 2 weeks, on 2 consecutive days.

The cattle were divided into 10 groups according to their initial live-weights and placed in paddocks, with those of similar live-weights together.

Group feeding was used. The rations and concentrated feed were prepared and the feed was analyzed at the Department of Animal Feeding and Feeding Diseases, Faculty of Veterinary Medicine, Ankara University. Sugar beet residue and wheat straw were used as roughage. The nutrient values and metabolic energy content of the roughage and concentrated feed are presented in Table 1.

During fattening, the feed conversion rate (FCR) was calculated and observed separately for each animal related to each weighing; interventions were made in the rough feed – concentrated feed quantities given daily, when necessary, in order to increase the FCR.

The FCR was calculated by dividing the total quantity of dry matter content feed consumed in 2 week periods by the live-weight gain in the same period (3).

The cost elements and the production costs were determined as advised by Sakarya (4). In assessing the enterprise results, the productivity rates and financial profitability and profitability factor ratios were inspected along with the effects of price and weight margins on the total sales income (5,6). The formula below was used with this aim (7-9).

$$I = Wb \times (Ps - Pp) + Ps \times (We - Wb)$$

In this formula

- I: Income gained from the sale of 1 head of cattle at the end of fattening (US \$),
- Wb: Average live-weight (LW) of 1 head of cattle at the beginning of fattening (kg),
- We: Average LW of 1 head of cattle at the end of fattening (kg),
- Pp: Average purchase price paid for 1 kg LW of the cattle to be fattened (US \$),
- Ps: Average sale price of 1 kg LW of cattle at the end of fattening (US \$).

Results

Technical Results

The technical results concerning fattening activity are shown in Table 2.

Tables 3 and 4 show the production costs determined as groups and in relation with the whole herd in the study, the shares of cost elements forming the cost in the grand total, technical partial productivity of feed as dry matter and labor inputs and results of profitability ratios.

Table 1. Nutrient values and metabolic energy content of the roughage and concentrated feed.

	Concentrated Feed	Sugar Beet Residue (15.17% Dry Matter)	Wheat Straw
Dry Matter (%)	91.73	95.96	88.00
Raw Ash (%)	8.52	4.12	5.2
Raw Protein (%)	14.13	9.9	3.2
Raw Fat (%)	1.56	0.66	1.3
Raw Cellulose (%)	6.8	21.3	39.8
Metabolic Energy (kcal/kg Dry Matter)	2560	2200	1152

Table 2. Technical results.

Groups:	I	II	III	Whole Herd
Average Initial Live-weight (kg/head)	186.36	220.97	273.56	220.76
Average Live-weight at the End of Fattening (kg/head)	364.99	410.88	482.39	410.90
Total Live-weight Gain (kg)	2 500	5 887	1 880	10 268
Daily Average Live-weight Gain (kg/head)	1.29	1.38	1.51	1.38
Feed Conversion Rate (FCR)	5.93	6.53	7.53	6.57

Table 3. Proportion of expenditure elements and unit production cost.

Groups:	I	II	III	Whole Herd
Fattening Material (%)	61.51	62.86	64.32	62.85
Feed (%)	24.75	25.30	25.89	25.29
Labor (%)	6.64	5.73	4.73	5.73
Supervising Fee (%)	2.66	2.29	1.89	2.29
Maintenance-Repair (%)	1.33	1.15	0.95	1.15
Veterinary Service – Drugs (%)	0.53	0.46	0.38	0.46
General Management Expenditures (%)	2.58	2.22	1.84	2.23
TOTAL (%)	100.00	100.00	100.00	100.00
Unit Live-weight Cost (US \$ / kg)	1.84	1.88	1.95	1.89

Table 4. Partial productivities, output/input rates, financial profitability and profitability factor results.

Groups:	I	II	III	Whole Herd
Partial Productivity of Feed (kg)	0.17	0.15	0.13	0.15
Partial Productivity of Labor (kg/day)	41.40	37.12	32.97	37.20
Financial Profitability (%)	41.42	37.21	33.16	37.34
Profitability Factor (%)	29.29	27.12	24.90	27.19
Output/Input Rate	1.41	1.37	1.33	1.37

Table 5 shows the average purchase and sale prices determined for the fattening activity, average live-weights per animal at the beginning and end of the fattening and results of the price and weight margins calculated using these data.

Discussion

When the technical results (Table 2) obtained in the research were assessed the daily average live-weight gain was usually higher than values given in the literature. In

previous studies performed on different dates regarding this subject, live-weight gains according to various races were as follows: average 1003 (g/d)/head (10); 1335 (g/d)/head (11), and 1031 (g/d)/head (12) in Brown Swiss; 1190 in Holsteins and 1150 (g/d)/head in Limousin x Jersey hybrids (3); 1060-1230 (g/d)/head (13) in Simmentals; and 820-1060 (g/d) / head (14) in various cattle races in Ankara province.

The daily average live-weight gain was higher than the data from studies in which fattening activity was taken into account. This is possibly because this data was

Table 5. Price and weight margins according to the groups.

Groups	Wb (kg)	We (kg)	Pp (US \$)	Ps (US \$)	Price Margin (US \$)	Price Margin (%)	Weight Margin (US \$)	Weight Margin (%)	I (US \$)
I	186.13	326.23	2.21	2.60	71.59	16.45	363.74	83.55	435.33
II	220.55	360.71	2.21	2.60	84.83	18.90	363.90	81.10	448.73
III	273.01	413.19	2.21	2.60	105.01	22.39	363.95	77.61	468.96
Whole Herd	218.70	359.48	2.21	2.60	84.12	18.71	365.51	81.29	449.63

continuously checked during the fattening and the daily feed composition was changed in the event of low performance. However, the fattening duration of 138 days was shorter than those in the literature. This is another possible reason for this value being high.

When the results concerning the daily live-weight gain are assessed according to groups, Group III, which had the highest initial live-weight, exhibited the best performance.

Kendir and Şenel (10) determined the FCR, which is another important criterion of technical assessment, to be 6.98 kg; Alpan (12) determined it to be 8.7 kg; Sakarya and Günlü (3) determined it to be 7.24-9.40 kg; and Altuntaş (13) determined it to be 7.4-10.5 kg. The FCR was lower in our research. Continuous assessment of the technical performance was effective. On the other hand, when the results of FCR are assessed according to groups, performance regarding benefiting from feed increased as the initial live-weight decreased.

The enterprise consequences (Table 3) show that as the initial live-weight decreases unit production cost also decreases. Within the total enterprise expenditure, fattening material was the largest element and feed and labor expenditure follow this in descending order. These data are consistent with those in the literature (3,8,14-18).

It was determined in the present study that an average 0.15 kg live-weight gain was achieved with dry matter feed of 1 kg, and an average 37.20 kg live-weight gain was achieved with 1-day labor. Polat (14) found partial feed productivity to be between 0.11 and 0.21 kg and partial labor productivity to be between 36.39 and 56.19.

When partial productivity results (Table 4) are assessed according to groups, feed and labor productivity increase as initial live-weight decreases.

Since there was no passive capital in the fattening activity, which is the subject of this research, only financial profitability and profitability factor ratios were examined. In these results, there was a reverse relationship with initial live-weight.

The financial profitability ratio values (Table 4) determined in the present study were higher than those given by Kabukçu (8) and Sakarya and Günlü (3). Kabukçu (8) found the financial profitability ratio to be between 9.98 and 20.10%. Sakarya and Günlü (3) calculated this ratio to be between 15.13 and 20.13%. On the other hand, our financial profitability ratio values were close to those given by Polat (14). The results for the profitability factor were similar to those in the literature.

The average price margin was 18.71% for the whole herd during the fattening activity in this research and the weight margin was 81.29% (Table 5). Sakarya and Günlü (3) calculated the price margin to be between 19.19 and 24.25% and Kabukçu (8) calculated it to be between 46.19 and 50.79%.

Our results regarding price margin were lower than those in the literature. This can be assessed from two aspects. Firstly, it can be explained by the fact that efforts to keep the technical performance continuously high during the fattening activity increase the effect of weight margin on the total enterprise income. Secondly, the fattening material cost is high. In recent years, the difficulties faced in livestock farming and the insufficiency in cattle supply, have caused a considerable increase in fattening material prices. In the fattening activity planning examined in this study, the enterprise targeted the Islamic Feast of Sacrifice, when live animal prices are at their highest. Despite this, the effect of price margin on income was low.

The results in general show that the technical assessment criteria are at the upper limits. The most frequently used criterion and the results regarding the daily live-weight gain per animal that producers use in assessing the performance and duration of fattening indicate that every technical success cannot be considered an economic success. However, Group III, which had the

highest daily live-weight gain, had the lowest values in terms of economic performance according to its profitability ratios and productivity values. For this reason, economic assessment mediums must also be used in addition to technical assessment criteria in determining whether the production factors used in the cattle fattening activity are employed productively.

References

1. Aral, S., Sakarya, E.: Türkiye Hayvan Üreticisi ve Besicisinin Örgütlenmesi. Ankara Ticaret Borsası Derg. 1989; 2: 10-14.
2. Aral, S.: Yükselen Et Fiyatları Karşısında Beslenme Sorunu ve Hayvancılık Politikası. Ankara Ticaret Borsası Derg. 1991; 10: 13-19.
3. Sakarya, E., Günlü, A.: Limuzin x Jersey (F₁) Melezi ve Holştayn Irkı Tosunlarda Optimal Besi Süresinin Tespiti Üzerine Bir Araştırma. Ankara Üniv. Vet. Fak. Derg. 1996; 43: 113-120.
4. Sakarya, E.: Eskişehir İli Sığır Besi İşletmelerinde Besi Maliyet ve Karlılıkları Üzerinde Bir Araştırma. Ankara Üniv. Sağlık Bilimleri Enstitüsü, Doktora Tezi, 1982; 25-44.
5. Aksöz, İ.: Ziraî Ekonomiye Giriş. Ziraî İşletmecilik Genel Kısım, Atatürk Üniv. Basımevi, Erzurum, 1972.
6. Cevger, Y.: Karaman İli Kuzu Besi İşletmelerinde Karlılık ve Verimlilik Analizleri. Ankara Üniv. Vet. Fak. Derg. 1997; 44: 277-290.
7. Snapp, R.R.: Beef Cattle, John Wiley and Sons Inc., New York, Chapman and Hall Ltd, London Fourth Edition, 1956; 24-26.
8. Kabukçu, M.A.: Elazığ İli Şeker Şirketi Besi Bölge Şefliğince Yönetilen Sığır Besi İşletmelerinin Ekonomik Analizi. Fırat Üniversitesi, Doçentlik Tezi, Elazığ, 1976.
9. Cevger, Y.: Karaman İli Kuzu Besi İşletmelerinde Fiyat ve Ağırlık Marjlarının Gelire Olan Etkileri. Türk-Koop EKİN Derg. 1999; 3: 84-88.
10. Kendir, H. S., Şenel, S.: Saf ve Melez Esmer Irk Danaların Değişik Rasyonlardaki Besi Kabiliyetleri ve Et Verimleri. Lalahan Zootečni Araştırma Enst. Derg. 1970; 10: 3-29.
11. Müftüoğlu, S., Eşcan, Ç.: Simental ve Esmer Irk Danaların Besi Performansları Üzerinde Karşılaştırmalı Bir Araştırma. Lalahan Zootečni Araştırma Enst. Derg. 1979; 19: 3-4.
12. Alpan, O.: Esmer, Holstein ve Simental Erkek Danalarda Besi Kabiliyeti ve Karkas Özellikleri. Ankara Üniv. Vet. Fak. Derg. 1972; 19: 388-400.
13. Altuntaş, M.: Simental Erkek Danaların Optimum Besi Sonu Ağırlıklarının Tespiti. Ankara Üniv. Sağlık Bilimleri Enstitüsü, Doktora Tezi, Ankara, 1996.
14. Polat, B.K.: Ankara İli Sığır Besi İşletmelerinde Karlılık ve Verimlilik Analizleri. Ankara Üniv. Sağlık Bilimleri Enstitüsü, Doktora Tezi, Ankara, 1997.
15. Birol, M.B.: Eskişehir'de Sığır Besi Maliyeti Konusunda Bir Araştırma. Et Endüstrisi Derg. 1975; 9: 13-15.
16. Aktaş, G.: Türkiye'de Sığır Besiciliğini Etkileyen Faktörler Üzerinde Bir Araştırma. Lalahan Zootečni Araştırma Enst. Derg., 1969; 25: 18-25.
17. Ölez, N.: Ankara Bölgesi Sığır Besiciliğinin Genel Karakterleri. Lalahan Zootečni Araştırma Enst. Yayn. No. 38, 1975, s. 76-83.
18. İmık, H., Günlü, A., Tekerli, M., Koçak, S.: Afyon İli'nde Yapılan Sığır Besiciliğinin Ekonomik Analizi ve Karlı Bir Besicilik İçin Alınması Gereklî Önlemler. Lalahan Hayvancılık Araştırma Enst. Derg., 2000; 40: 1-15.