Turk J Vet Anim Sci
24 (2000) 443-446

The Effects of Weaning Age on the Growth, Milk and Milk Fat Characteristics of Brown Swiss Cattle

Mete YANAR, Recep AYDIN
Department of Animal Science, College of Agriculture, Atatürk University, 25240, Erzurum. Türkiye

Geliş Tarihi: 16.12.1999

Abstract : In this research, the effects of early weaning on the growth rate and milk production characteristics of Brown Swiss cattle in later years were investigated. The calves used in the study were weaned at 5, 7 and 9 weeks of age, and the weights obtained at 6, 9, 12, 15 and 18 months of age were not significantly affected by the age of weaning. The weight gains determined between 6 and 18 months of ages with 3-month intervals were also not significantly affected by the different ages of weaning.

The various ages of weaning did not result in a significant adverse effect on the 305-day milk yield, the percentage of milk fat or the 305-day milk fat yield characteristics.

The results of this study suggested that the early weaning of Brown Swiss female calves at 5 weeks of age would not have a detrimental effect on the subsequent growth, milk and milk fat yield traits.

Key Words: Cattle, Brown Swiss, Early Weaning, Growth, 305-day Milk Yield

Erken Sütten Kesimin Esmer Sığırların Büyüme, Süt ve Süt Yağı Özellikleri Üzerine Etkileri

Özet : Bu araştırmada, erken sütten kesimin Esmer sığırların ilerki yıllarda gelişme hızı ve süt verim özellikleri üzerine etkisi incelenmiştir. Araştırmada kullanılan buzağılar 5, 7 ve 9 haftalık yaşlarda sütten kesilmiş ve 6, 9,12,15 ve 18 ay ağırlıkları sütten kesim yaşları tarafından önemli derecede etkilenmediği bulunmuştur. Altı ile 18 aylık yaşlar arasında 3'er aylık aralıklarla belirlenen canlı ağırlık artışları da farklı sütten kesim yaşlarından önemli derecede etkilenmemiştir.

Çeşitli sütten kesim yaşlarının, 305-günlük süt verimi, süt yağı oranı ve 305-günlük yağ verimi üzerine önemli derecede olumsuz etkisi bulunmamıştır.

Bu çalışmanın sonuçları, dişi Esmer buzağıların 5 haftalık yaşta erken sütten kesilmeleri halinde, ilerki dönemlerdeki büyüme ile süt ve süt yağı verim özellikleri bakımından olumsuz bir etki meydana getirmeyeceğini göstermiştir.

Anahtar Sözcükler: Sığır, Esmer, Erken Sütten Kesim, Büyüme, 305-Günlük Süt Verimi

Introduction

Calf-rearing programs have changed significantly over the last several decades. The recommended age for the weaning of calves has been reduced from 8-12 weeks to 5-6 weeks (1). Recent studies on early weaning of dairy calves indicate that the calves can be weaned successfully even earlier (2-5). However, in Turkey, the weaning age of calves ranges from 7 to 12 weeks (6). The milk-feeding period has to be reduced in order to take advantage of several benefits of the early weaning program. The early weaning program reduces feed cost because of early transition to dry feeds which are more economical than milk, and reduces the liquid-feeding period when calves are subject to scours and digestive problems. It also lessens the number of individual pens required for liquid-feeding, and diminishes the number of calves on the liquid-feeding program at the same time. Therefore, the animals can be given better care, which should result in improved health during that period (1).

Several studies have been carried out in order to demonstrate the influence of the early weaning program on the growth characteristics of Brown Swiss calves reared in the Eastern Region of Anatolia (7-11). However, the effect of the early weaning on the growth pattern of heifers and first lactation 305-day milk and milk fat characteristics have not been investigated

previously. Therefore, this study was undertaken to provide information about whether the different early weaning ages (5, 7 and 9 weeks of age) have adverse effects on the subsequent growth and milk performance characteristics of Brown Swiss cattle.

Materials and Methods

Twenty-three female Brown Swiss cattle reared in the Research Farm of Agricultural College at Atatürk University were used in this study. The young animals were weaned at 5, 7 and 9 weeks of age. Once calves reached 6 months of age, they were included in the study and subjected to similar feeding and management practices during the experiment. The cattle were housed in a stall barn between October and April. In April, they were transferred to an open shed free stall barn for approximately 2 months. Then, they went to the pasture of the Research Farm of the Agricultural College where the herd grazed until October. Heifers were not offered additional concentrate during the grazing period.

Lactating cows during the pasture season were fed 4-5 kg/head concentrate daily in addition to the roughage grazed from the pasture. In winter and spring, dry hay, wet sugar beet pulp and concentrate were fed to the animals. The quantity of wet sugar beet pulp offered to each animal ranged from 8 to 10 kg/head/day.

Weights at 6, 9, 12, 15 and 18 months of age were obtained by using bridge scales. First lactation 305-day milk yields from each animal were calculated using the second method reported by IKEWM (12). Milk fat percent analyses were carried out on the milk samples taken from cows every month by employing the method of Gerber (13).

The data concerning milk and milk fat yield characteristics were standardised in terms of non-genetic factors such as calving year and calving season. Then, the data were statistically analysed by using the Harvey statistics program (14).

Results

The weights and daily weight gains determined at 6, 9, 12, 15 and 18 months of age are shown in Table 1. The weights were not significantly (P>0.05) affected by the ages of weaning. Also, different ages of weaning had no significant (P>0.05) effect on the average daily weight gains between 6 to 9, 9 to 12, 12 to 15 or 15 to 18 months of age (Table 1).

The effect of ages of weaning on the first lactation milk and milk fat characteristics of Brown Swiss cattle were investigated and the results are presented in Table 2. First lactation 305-day milk yield of Brown Swiss cattle fed milk for 5, 7 and 9 weeks was not significantly

Table 1. Weights and Daily Weight Gains of Brown Swiss Cattle Weaned at Various Ages

	Age of Weaning			
	5 Weeks X ± Sx n = 9	7 Weeks X ± Sx n = 7	9 Weeks X ± Sx n = 7	Significance
Weights (kg) at:				
6 Months of Age	127.6 ± 6.06	127.5 ± 6.87	127.8 ±6.87	NS
9 Months of Age	168.4 ± 3.41	164.1 ± 3.88	161.9 ± 3.95	NS
12 Months of Age	197.7 ± 3.37	202.0 ± 3.84	198.9 ± 3.91	NS
15 Months of Age	230.1 ± 2.50	234.4 ± 2.81	234.7 ± 2.86	NS
18 Months of Age	250.4 ± 6.27	260.3 ± 7.05	257.2 ± 7.14	NS
Daily Weight Gains (kg) Between:				
6 to 9 Months	0.452 ± 0.036	0.406 ± 0.041	0.379 ± 0.041	NS
9 to 12 Months	0.325 ± 0.034	0.420 ± 0.039	0.406 ± 0.039	NS
12 to 15 Months	0.325 ± 0.028	0.361 ± 0.032	0.395 ± 0.032	NS
15 to 18 Months	0.224 ± 0.052	0.285 ± 0.059	0.249 ± 0.059	NS
6 to 18 Months	0.336 ± 0.021	0.361 ± 0.024	0.356 ± 0.024	NS

X ± Sx : Least Squares Means ± Standard Error, NS : Non-Significant

affected by the early weaning procedure (Table 2). Also, the ages of weaning did not have a significant effect (P>0.05) on the percentage of milk fat and 305-day milk fat yield traits.

Discussion

Body weights and weight gains of Brown Swiss heifers determined at 6, 9, 12, 15 and 18 months of age were not significantly influenced by different ages of weaning (Table 1). In other words, the early weaning at 5 weeks of age did not result in an adverse effect on the growth rate of the animals between 6 and 18 months of age. Similar results were also reported by Arpacık et. al. (15), who reported that 6, 12 and 18 month weights of Karacabey Brown Swiss heifers already fed different amounts of milk were not significantly different.

Weights determined at 6, 9, 12, 15 and 18 months of age were lower than standard weights of Brown Swiss heifers in the United States (16). Also, some of the studies conducted in Turkey (17,18) indicated that 6, 12 and 18 month weights of heifers reared in the Research Farm of the Agricultural College at Atatürk University were lower than their findings. However, 6 and 12 month weights in the present study were higher than those of Brown Swiss reared in the Koçaş State Farm (19). The differences between our findings and the results of other studies concerning weights could be attributed to the different feeding and management practices used in these farms.

The results concerning first lactation 305-day milk yield, the percentage of milk fat and 305-day milk fat yield of Brown Swiss cows weaned at 5, 7 and 9 weeks of age revealed that early weaning did not have a detrimental effect on the milk and milk fat production characteristics. The findings regarding 305-day milk yield of early weaned cows was in accordance with results of Yanar et al. (20), but higher than the results of Cengiz (19), Kaygısız et al. (21) and İlaslan (22).

The results of the present study suggest that if Brown Swiss calves reared under the conditions of the Eastern Region of Anatolia are weaned at 5 weeks of age, their growth rate prior to 18 months of age, first lactation 305-day milk and milk-fat traits are not adversely influenced by the early weaning program

Table 2. Milk and Milk Fat Yield Characteristics of Brown Swiss Cattle Weaned at Different Ages

	Age of Weaning			
	5 Weeks	7 Weeks	9 Weeks	
	X ± Sx n = 9	X ± Sx n = 7	X ± Sx n = 7	Significance
305-Day Milk Yield (kg)	2422.2±173.7	2478.5±191.5	2398.6±131.5	NS
Percent of Milk Fat (%)	4.17±0.13	4.10±0.16	4.26±0.15	NS
305-Day Milk Fat Yield (kg)	100.8±11.2	101.1±16.9	101.6±14.56	NS

X ± Sx : Least Squares Means ± Standard Error, NS : Non-Significant

References

1. Winter, K.A.: Weaning Dairy Calves at Three Weeks and Feeding Fermented Colostrum. 1981. Publication 1721, Information Services, Agriculture Canada, Ottowa.
2. Winter, K.A.: Comparative Performance and Digestibility in Dairy Calves Weaned at Three, Five and Seven Weeks of Age. Canadian J. Animal Sci., 1985; 65, (2): 445-450.
3. Yun, S.G., Chung, C.Y.: The Effect of Weaning Time on the Growth and Feed Efficiency in Dairy Calves. Korean J. Dairy Sci., 1985; 7, (2): 49-55.
4. Oppedeal, A.: Earlier Weaning Can Pay. Dairy Herd Management, 1986; 23, (11): 32-33.
5. Garcia, G., Gomez, G., Sepulveda, V.L.: Effect of Early Weaning on Performance of Calves Fed on Fermented Colostrum. Dairy Sci. Abst., 1992: 54, (8): 5128.
6. Yanar, M. Uğur, F., Tüzümen, N., Aydın, R.: İki Değişik Sütle Besleme Programının Esmer Buzağıların Büyüme Özellikleri Üzerine Etkileri. Hayvancılık '96 Ulusal Kongresi, İzmir, 1996.
7. Yanar, M., Tüzemen, N., Ockerman, H.W.: Comparative Growth Characteristics and Feed Conversion Efficiencies in Brown Swiss Calves Weaned at Five, Seven and Nine Weeks of Age. Indian J. Animal Sci., 1994: 64, (6): 708-711.

8. Yanar, M., Tüzemen, N., Aydın, R., Akbulut, Ö., Ockerman, H.W.: Growth Characteristics and Feed Efficiencies of the Early Weaned Brown Swiss, Holstein Friesian and Simmental Calves Reared in Turkey. Indian J. Dairy Sci., 1994: 47, (4): 273-275.

9. Aydın, R., Emsen, H., Yanar, M., Tüzemen, N.: The Effect of Levels of Milk Feeding on the Performance of Brown Swiss Calves Raised in Turkey. Agriculture and Equipment International, 1994: 46, (3-4); 18-20.

10. Yanar, M., Tüzemen, N., Aydın, R., Uğur, F.: Early Weaning of Brown Swiss Calves Raised in Eastern Turkey. Agriculture and Equipment International, 1995: 47, (1-2); 20-21.

11. Uğur, F., Yanar, M.: Effect of Different Weaning Ages on the Growth and Feed Conversion Efficiencies in Holstein Friesian Calves. Indian J. Animal Sci., 1997: 68, (12): 1284-1286.

12. Anonymous: Internationales Komitee zur Ermittlung Der Wirtschaflichkeit von Milchtieren, Internationales Abkomen Über die Methoden der Milchleistungsprüfung Bei Kühen. Das Tierzuchtrecht in der Bundesrepublik Deutshland, Nbt: 310, 1976.

13. Kurt, A.: Süt ve Mamülleri Muayene ve Analiz Metotları Rehberi. Atatürk Üniversitesi Yayın. No: 252, Erzurum, 1972.

14. Harvey, W.R.: User's Guide for LSMLMM, PC-1 Version, Ohio State University, Columbus, Ohio, USA, 1987.

15. Arpacık, R., Yosunkaya, H., Erturan, M.: Farklı Miktarlarda Süt ile Beslenen Karacabey Esmeri Dişi Buzağıların Büyüme ile Fertilite Performanslarının Karşılaştırılması. TÜBİTAK, VI. Bilim Kongresi, Veterinerlik ve Hayvancılık Araştırma Grubu Tebliğleri, Ankara, 1977.

16. Heinrichs, A.J., Hargrove, G.L.: Standards of Weight and for Ayrshire, Brown Swiss and Milk Shorthorn Heifers. J. Dairy Sci., 1994: 77: 1676-1681.

17. Tümer, S., Kırcalıoğlu, A., Nalbant, M.: Ege Bölge Zirai Araştırma Enstitüsünde Yetiştirilen Siyah Alaca, Esmer ve Simmental Sığırların Çeşitli Verim Özellikleri Üzerinde Araştırmalar. Ege Bölge Zirai Araştırma Enst. Yay. No: 53, 1985.

18. Gürbüz, A., Apaydın, M.: Ankara Çayır Mera ve Zootekni Araştırma Enstitüsünde Yetiştirilen Sığırların Çeşitli Verim Özellikleri ve Bunların Artırılma Olanakları. Büyükbaş ve Küçükbaş Hayvancılık Ülkesel Araştırma Projeleri. Tarımsal Araştırma Müd., Ankara, 1992.

19. Cengiz, F.: Malya ve Koçaş Devlet Üretme Çiftlikleri Koşullarında Siyah Alaca ve Esmer Sığırların Çeşitli Özellikler Bakımından Karşılaştırılması. (Dissertation). Ankara Üniversitesi, Ziraat Fakültesi, Zootekni Bölümü, 1982.

20. Yanar, M., Tüzemen, N., Akbulut, Ö., Aydın, R., Uğur, F: Atatürk Üniversitesi Ziraat Fakültesi Çiftliğinde Yetiştirilen Esmer Sığırların Süt ve Döl Verim Özellikleri. Doğu Anadolu Tarım Kongresi Tebliğleri, 14-18 Eylül, Erzurum, 1998.

21. Kaygısız, A., Baş, S., Görentaş, Y.: Esmer Sığırların Altındere Tarım İşletmesi Şartlarında Adaptasyon ve Verim Özellikleri. Tarım Bilimleri Dergisi, 1996: 2, (2): 21-31.

22. İlaslan, M.: Kars İli Büyükboğatepe Köyünde Yetiştirilen Esmer Sığırlarda Vücut Yapısı, Süt ve Döl Verimleri Üzerinde Araştırmalar. (Dissertation). Ankara Üniversitesi, Ziraat Fakültesi, Zootekni Bölümü, 1978.