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EFFECTS OF CALVING SEASON ON MILK YIELD OF HOLSTEIN COWS RAISED AT DALAMAN STATE FARM IN TURKEY*

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ABSTRACT

Data of 866 lactations collected from 251 cows raised at Dalaman State Farm in Muğla province between 1989 and 1996 were analyzed. Two calving seasons were determined on data set based on average monthly air temperature. These are the first calving season (November 1st - April 30th) which is within the comfort zone for cows, and the second calving season (May 1st - October 31st). Milk yield, calving year, lactation number and calving season were evaluated. The effect of lactation number ($p<0.01$), calving year ($p<0.01$) and, calving season ($p<0.01$) on 305-d milk yield were found statistically significant. The least-square means and standard errors of milk yield for the first and the second calving season were 7493.54±70.29 kg and 7180.63±81.08 kg, respectively.

Key words: Calving season, milk yield, holstein

Dalaman Tarım İşletmesinde Yetiştirilen Siyah-Alacalarda Buzağılama Mevsiminin Süt Verimine Etkisi

ÖZET

Muğla İli Dalaman Tarım İşletmesinde 1989 1996 yılları arasında yetiştirilen 251 hayvana ilişkin toplam 866 laktasyon verileri toplanarak değerlendirilmiştir. Aylık ortalama hava sıcaklıkları dikkate alınarak iki buzağılama mevsimi oluşturulmuştur. Bunlar, konfor sınırları içerisinde olan 1. buzağılama mevsimi (01 Kasım 30 Nisan) ve 2. buzağılama (01 Mayıs 31 Ekim) mevsimidir. Süt verimleri, buzağılama yılı, laktasyon sırası ve buzağılama mevsimi değerlendirilmiştir. Yapılan değerlendirmede 305 günlük süt verimine laktasyon sırası ($p<0.01$), buzağılama yılı ($p<0.01$) ve buzağılama mevsiminin etkisi ($p<0.01$) önemli bulunmuştur. Süt verimine ilişkin 1. ve 2. buzağılama mevsiminin en küçük kareler ortalamaları ve standart hataları sırasıyla 7493.54±70.29 kg ve 7180.63±81.08 kg olarak belirlenmiştir.

Anahtar kelime: Buzağılama mevsimi, süt verimi, Siyah-Alaca

Introduction

Milk and meat is mainly produced for the cattle in Turkey. The cattle population of Turkey contributes 21,5% of total livestock population accounting for 11,8 million heads (Anonymous, 1996). The percentage of cows in the cattle population in Turkey is about 50%, accounting for 5,9 million heads. The population is composed of exotic breeds (15,1%), native breeds (43,6%) and, native and exotic crosses (41,3%) (Anonymous, 1996). The percentage of the cow milk in the total milk production is rising highly in recent years in Turkey.

Dalaman State Farm located in the western part of Turkey called as Aegean Region has a large cattle population to develop the milk yield per cow to a higher amount. This research was conducted at Dalaman State Farm in Muğla province between the years 1989 and 1996 to determine the effects of calving season, calving year and lactation number on milk yield of Holstein cows in Turkey.

Material

The material of this research has obtained from collecting data belonging to cattle raised at Dalaman State Farm. 305-d milk yield were computed. 2833 lactation records of 1119 cows were used between 1984 and 1997. Missing test days lactation records (1239), incomplete lactations (667) and, lactation lengths less than 270-d (61) were ignored in the 305-d milk yield calculation. As a result of elimination, data for 866 lactations of 251 cows were found suitable for evaluation.

Method

The statistical model of the analysis is used for calculations (Düzgüneş et al., 1987; Düzgüneş et al., 1991);

$$Y_{ijkl} = \mu + l_i + s_j + y_k + e_{ijkl}$$

Two calving seasons were determined on data set based on monthly average air temperature. These are the first calving season (November 01st - April 30th) which is within the comfort zone for cows, and the second calving season (May 01st - October 31st). The averages of air temperature in the months of the first calving season are between +10 C and +19 C. This zones are called as comfort zone for cattle (Ensminger, 1980; Sainsbury, 1986; Schmidt et al., 1988).It was found that the averages of air temperature in the

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second is higher than the first and, it is considered that the performances of cows in this season is affected by the high air temperature.

Results and Discussion

Average lactation length was found 335,03±0,72 days and, the longest lactation was 462 days. 305-d milk yield average of the herd was found 7337,08±53,66 kg on milk production, 305-d some environmental effects such as lactation number, calving season and years of calving were found statistically significant ($p<0,01$). Interactions between calving season and lactation number, calving season and year of calving were found insignificant. Cows in the first calving season were produced 312,9 kg more milk than the second and, found statistically significant ($p<0,01$). These results agree with the other results (Ahn et al., 1994; Dass and Sharma, 1994; Kemenes et al., 1994; Martin and Bhuiyan, 1994; Nigm et al., 1994; Patel and Triphati, 1994; Pilipenko et al., 1994; Sadek et al., 1994; Soliman, 1994; Sreemannarayana and Rao, 1994; Şekerden ve Erdem, 1994; Singh, 1995; Uğur et al., 1995; Ali et al., 1996; Arora et al., 1996; Govindaiah et al., 1996; Jatt et al., 1996; Malau et al., 1996). Least-square means and standard errors of 305-d milk yield for calving season were calculated as 7493,5±70,3 kg and 7180,6±81,1 kg for the first and second calving season, respectively.

Conclusion

In conclusion, calving season has an effect on 305-d milk production. This is because of high environmental temperature and high humidity in summer months in Mediterranean climates. By changing some management practices such as preferring the first season as calving season will be beneficial. In addition to that some of the losses can be saved with an additional investment i.e., evaporative cooling etc. Yıldız et al. (1999) estimated that the losses is between 101 and 400 kg of milk in summer season and added that about 70% of the milk losses can be saved back with evaporative cooling. The cooling system costs should be taken in consideration.

References

AHN, B.S., SANG, B.D., YOON, M.S., JEON, J.W., LEE, H.J., YOO, C.H., CHO, C.H., 1994. Effects of Body Condition, Calving Interval, Calving Difficulty and Calving Season on Day of Peak Milk Yield and Peak Milk Yield. Korean Journal of Animal Sciences. 36:2, 129-132. Korea Republic. Cab Abst.

ALI, A.K.A., AL JUMAAH, R.S., HAYES, E., 1996. Lactation Curve of Holstein Friesian Cows in the Kingdom of Saudi Arabia. Asian Australasian Journal of Animal Sciences. 9:4, 439-447. Saudi Arabia. Cab Abst.

ANONYMOUS, 1996. Tarımsal Yapı (Üretim, Fiyat, Değer). T.C. Başbakanlık DİE, Ankara.

ARORA, C.L., SINGHAL, R.A., GARG, R.C., SUBRAMANIAN, N.B., 1996. Age at First Calving in Frieswal Cows and Its Influence on First Lactation Milk Traits. Indian Journal of Animal Sciences. 66:10, 1067-1069. India. Cab Abst.

DASS, G., SHARMA, R.C., 1994. Factors Affecting Milk Production in Murah Buffaloes. Indian Journal of Animal Research. 28:1, 61-64. India.

DÜZGÜNEŞ, O., KESİCİ, T., KAVUNCU, O., GÜRBÜZ, F.,1987. Araştırma ve Deneme Metodları. (İstatistik Metodları - II) Ankara Üniversitesi Ziraat Fakültesi Yayınları: 1021, Ders Kitabı:295, Ankara.

DÜZGÜNEŞ,O., ELİÇİN,A., AKMAN,N., 1991. Hayvan Islahı. II. Baskı. Ankara Üniversitesi Ziraat Fakültesi Yayınları :1212. Ders Kitabı: 349. Ankara.

ENSMINGER, M.E., 1980. Dairy Cattle Science. Second Edition. ISBN 0-8134-2079-2. The Interstate Printers & Publishers, Inc. Danville, Illinois.

GOUINDALAH, M.G., SANTI, S.V., JAYASHANKAR, M.R., KRISHNAPPA, S.B., GANGADHAR, K.S., 1996. Percistency of Lactation Milk Yield in Crossbred Cattle. Indian Journal of Dairy and Biosciences, 7:56-60. India. Cab Abst.

JAT, R.P., GAHLOT, G.C., BARHAT, N.K., CHOUDHARY, J.L., 1996. Factors Affecting Production Traits in Rathi Cow Conserved for Semi Arid Zone of Rajasthan (Nohar). Indian Veterinary Journal, 73:8, 903-804. India. Cab Abst.

KEMENES, P.A., VIEIRA, P.F., FREITAS, M.A.R. de, OLIVEIRA, H.N., FIGUEIREDO, V.P., ARMENIA ROMALHO de FREITAS, M., ROMALHO de FREITAS, M.A., NUNES OLIVERA, H., 1994. Evaluation of Productive and Reproductive Traits in Sao Paulo Jersey Herd. Boletim de Industria Animal. 51:1, 43-48. Brasil. Cab Abst.

MALAU ADULI, A.E.O., ABUBAKAR, B.Y., EHOCHT, O.W., DIM, N.I., 1996. Studies on Milk Production and Growth of Friesian X Bunaji Crosses: I. Dairy Performance. Asian Australasian Journal of Animal Sciences, 9:5, 503-508. Cab Abst.

Table 1. Number of lactations (NL) and milk yields (MY) in calving seasons, years of calving and, lactation numbers.

Calving seasons	NL day	MY kg
1st calving season	416	7493.54± 70.29
2nd calving season	450	7180.63± 81.08
Lactation number	**NL day**	**MY kg**
1st lactation	192	6614.48±101.68
2nd lactation	198	7182.79± 96.57
3rd lactation	168	7465.80±101.28
4th lactation	125	7757.05±118.38
5th + lactation	183	7665.30± 97.35

Years of calving	NL day	MY kg
1989	74	6602.86±143.65
1990	118	6649.73±116.26
1991	132	7463.57±113.67
1992	144	7280.49±106.16
1993	143	7870.81±104.60
1994	129	8702.27±112.90
1995	104	7477.48±125.75
1996	22	6649.45±288.64

MARTIN, M.A., BHUIYAN, A.K.F.H., 1994. Effect of Genetic and Non-Genetic Factors on Milk Yield and Birth Weight of Pure and Crossbred Cattle in Bangladesh. Bangladesh Journal of Animal Science. 23:1-2, 57-65. Bangladesh. Cab Abst.

NIGM, A.A., ABOUL ELA, M.B., SADEK, R.R., IBRAHIM, S.A.M., 1994. Milk Production Characteristics in the First Two Lactations of Friesian Cattle in the United Arab Emirates. Egyptian Journal of Animal Production. 31:2, 235-249. Cab Abst.

PATEL, A.K., TRIPATHI, Y.N., 1994. Effect of Certain Non-Genetic Factors Affecting Some Production Traits in Surti Buffaloes. Indian Journal of animal Science. 47:12, 1038-1042. India. Cab Abst.

PILIPENKO, L.A., PILIPENKO, M.O., 1994. Ways of Improving the Production of Animal Products. Nauchno Teknicheskii Byulleten, Ukrainskii Institut Zhivotnouodstva. No.65, 32-35. Ukraine. Cab Abst.

SADEK, R.R., HELALI, E.A., SAFWAT, M.A., IBRAHIM, S.A.M., ABD el FATAH, A., 1994. Evaluation of Friesian Cattle Performance in Commercial Farms in Egypt. Egyptian Journal of animal Production. 31:1, 43-64. Egypt. Cab Abst.

SAINSBURY, D., 1986. Farm Animal Welfare. Cattle, Pigs and Poultry. ISBN 0-00-383157-4. United Kingdom.

SCHMIDT, G.H., L.D. VAN VLECK, M.F. HUTJENS, 1988. Principles of Dairy Science. Second Edition. Prentice Hall, Englewood Cliffs, NJ 07632. New Jersey.

SINGH, S.R., 1995. Variation in Some Performance Traits in Friesian X Zebu Cows. Indian Journal of Animal Science. 48:1, 27-30. India. Cab Abst.

SOLIMAN, A.S., 1994. Factors Affecting Body Weight of Heifers and Milk Traits of Russian Black Pied Cows. Annals of Agricultural Science, Moshtohor. 32:3, 1423-1443. Cab Abst.

SREEMANNARAYANA, O., RAO, A.U.N., 1994. Effect of Service Period and Season of Calving on Lactation Traits Among Crossbred Cows. Indian Veterinary Journal. 71:11, 1094-1097. Cab Abst.

ŞEKERDEN, Ö., ERDEM, H., 1994. Jersey Sığırlarında Bazı Döl ve Süt Verim Özellikleri Arasındaki İlişkiler ve İncelenen Özellikleri Etkileyen Çevresel Faktörler. Türk Veterinerlik Hayvancılık Dergisi, 18:5, 281-286.

UĞUR, F., YANAR, M., ÖZHAN, M., TÜZEMEN, N., AYDIN, R., AKBULUT,Ö., 1995. Atatürk Üniversitesi Ziraat Fakültesi Araştırma Çiftliğinde Yetiştirilen Sarı Alaca Sığırların Süt Verim Özellikleri. Türk Veterinerlik ve Hayvancılık Dergisi. 19:5, 365-368.

YILDIZ, İ., OKAN, A.E., YEŞİLIRMAK, E., 1999. Expected Seasonal Production Benefits From Evaporative Cooling for Dairy Cattle in Türkiye. 7th International Congress on Mechanization and Energy in Agriculture, ICAME'99. 388-343; 26-27 May 1999, Adana, Türkiye.

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