Pakistan Journal of Applied Sciences 3 (3): 203-205, 2003
ISSN 1607-8926

Influence of Previous Calving Intervals on Milk Yield Traits of Holstein-Friesian Cattle Reared in the Kumkale State Farm Located in Western Anatolia

Feyzi UĞUR
Çanakkale Onsekiz Mart University, Faculty of Agriculture,
Animal Science Department, 17100, Çanakkale, Turkey

ABSTRACT

Effects of 6 different calving intervals on the milk yield traits of Holstein–Friesian cattle were investigated. The intervals were 325 days and below *(1),* 326-345 *(2),* 346-375 *(3),* 376-400 *(4),* 401-450 *(5)* and 450 days and above *(6).* Maximum 305- day milk yield, average daily milk yield and actual milk yield were obtained on the 6th group and the longest lactation length was obtained on 4th calving interval group. Averages of the 305-day milk yield, actual milk yield and average daily milk yield obtained from 2nd group was higher than 3rd, 4th and 5th calving interval groups. The effect of the groups on 305 - day milk yield, actual milk yield, average daily milk yield and lactation length was found statistically insignificant. The correlation coefficient between calving interval and 305-days milk yield was 0.18. R^2 originated from calving interval was 3.2% for 305-day milk yield. In conclusion, these result, indicated that the 326–345 days length on calving intervals did not have any negative effect on milk production traits of Holstein Friesian cattle.

Key words: Cattle, milk yield, calving interval

INTRODUCTION

In cattle breeding, one of the concerns is the fertility of cattle and animals are expected to conceive every year. Decreasing the calving interval will help to have calves every year. Calving interval can be controlled by decreasing the service period.

Milk yield is affected adversely by abnormal calving interval. For an optimum milk yield, 12 months or shorter calving interval periods have been suggested (Özhan *et al.*, 2001). Previous research indicates that calving interval has some effect on milk yield traits (Raheja, 1991; Schaefer and Henderson, 1972; Nobre *et al.*, 1986 and Akbulut and Haussman, 1994).

Limited research have been published in Turkey on effects of the calving interval on the milk traits of cattle (Tüzemen 1998). In this study, effects of calving interval on milk yield traits of Holstein Friesian raised in Kumkale State farm, Turkey were investigated.

MATERIALS AND METHODS

The milk yield records of Holstein - Friesian cattle, raised in the Kumkale State Farm, Çanakkale, Turkey, were used.

The investigated parameters included 305 - day milk yield, actual milk yield, average daily milk yield and lactation length. Second method of *IKEWM* was applied for the calculation of milk yield characteristics (Anonymous, 1976).

Because of some reasons which are not related to the genotype such as the selling and dying, the lactation, not completed in the 305 days, were not included in the analysis.

In this research, year x season interaction was taken out of the model, because it was insignificant. Statistical models used for analysis of variance were as follows:

For actual milk yield and average daily milk yield,

$$y_{ijklmn} = \mu + a_i + Y_j + S_k + P_l + C_n + b(x_m - \bar{x}) + e_{ijklmn}$$

For 305- day milk yield and lactation length,

$$y_{ijklmn} = \mu + a_i + Y_j + S_k + P_l + C_n + e_{ijklmn}$$

Where; Y_{ijklm} = 305- day milk yield, actual milk yield, average milk yield, lactation length, μ = overall mean, a_i = random cow - effect, Y_j = fixed effect of calving year, S_k = fixed effect of calving season, P_l = fixed effect of parity, C_n = fixed effect of calving interval, b = regression coefficient of lactation length between trait, x_m = lactation length, $\bar{x}$ = mean of lactation length, e_{ijklm} = residual

Table1: The formed calving interval groups

Calving interval, days	Calving Interval Groups
325 and below	1
326–345	2
346–375	3
376–400	4
401–450	5
450 and higher	6
310–357	Min-Max values

In this study, 126 data from the years of 4 years were examined for the parity, calves were classified according to 2nd, 3rd, 4th, 5th, 6th lactation and the cattle above 7th were classified as 7 +. Data concerning calving seasons were also classified as four groups named Season 1 (between March–May), Season 2 (between June–August), Season 3 (between September–November) and Season 4 (between December–February). Also, calving intervals were searched in 6 different groups (Table 1).

In this research, correlation and regression analyses between 305-days milk yield and calving interval were also calculated .

Data were analyzed by SAS statistical program (SAS, 1996).

RESULTS AND DISCUSSION

The results are given presented in Tables 2 and 3. Effects of the investigated calving interval groups on 305 - day milk yield, actual milk yield, average daily milk yield and lactation length was found statistically insignificant.

Table 2: Least squares means and their standard errors for 305-days milk yield and actual milk yield

	305-Day milk yield (kg)				Actual milk yield (kg)		
	N	$\bar{x}$	P	S_x	$\bar{x}$	P	S_x
Overall	126	6204.9		265.2	6427.3		255.6
Calving interval groups			0.10			0.06	
1	14	5813.5		286.6	6007.2		275.3
2	37	6200.7		192.4	6521.0		185.3
3	28	6060.6		226.2	6347.9		218.6
4	8	6150.3		364.9	6207.3		353.9
5	21	6180.8		254.1	6464.1		244.0
6	18	6784.4		267.1	7000.9		256.9

P: Significance

The highest 305-day milk yield, actual milk yield and average daily milk yield were obtained from the 6th group. Moreover, the minimum 305-day milk yield was obtained from 1st group.

The longest and shortest lactation length, obtained from 4th and 3rd calving interval groups, were 341.6 ± 17.2 and 302.9 ± 10.7 days, respectively.

Averages of milk yield, obtained from 1st calving interval group, were higher than expected. However, calving intervals shorter than 325 days can be risky and is not suggested (Özhan *et al.*, 2001).

Averages of the 305-day milk yield, actual milk yield and average daily milk yield obtained from 2nd groups were higher than 3rd, 4th and 5th calving interval groups. For example, 305- day milk yields of 2nd and 5th groups were 6200.7 ± 192.4 and 6118.8 ± 254.1 kg, respectively. Yield differences between two groups was 19.9 kg.

Table 3: Least squares means and their standard errors for averages daily milk yield and lactation length

	Average daily milk yield (kg)				Lactation length (days)		
	N	$\bar{x}$	P	S_x	$\bar{x}$	P	S_x
Overall	126	20.3		0.84	317.5		12.5
Calving interval groups			0.051			0.34	
1	14	19.2		0.91	311.3		13.5
2	37	20.8		0.61	307.9		9.11
3	28	20.0		0.72	302.9		10.7
4	8	19.4		1.18	341.6		17.2
5	21	20.4		0.81	315.3		12.0
6	18	22.3		0.85	324.5		12.6

P: Significance

This difference is small and it can be ignored for breeding purposes. This finding suggests that, the Holstein Friesian cattle, raised in this farm, could optimally stay in calving interval for 326–345 days.

R^2 value (Coefficient of determination) originated from calving intervals was 3.2% for 305-day milk yield. This value was low compared to literature values (Akbulut and Haussman, 1994). Phenotypic correlation coefficient between calving interval and 305- day milk yield was 0.18 (P = 0.03).

Different calving intervals have been suggested in literature. Tüzemen *et al.* (1998) suggested 405-435 days, Stodola *et al.* (1979) suggested 396-405 days and Akbulut and Haussman (1994) suggested 395-414 days of calving interval. We suggest that interval between calvings should be between 326-345 days.

In conclusion, our results indicate that the 326–345 days length on calving intervals have not any negative effect on milk production traits of Holstein Friesian cattle. The suggested length of calving interval may have a positive effect on the profits of a farm.

REFERENCES

Akbulut, Ö. and H. Haussman, 1994. Buzağlama Aralığının Süt Verim Özelliklerine Etkisi. Atatürk Üniversitesi Ziraat Fakültesi Dergisi, 25: 1-13.

Anonymous, 1976. Internationales Komitee zur Ermittlung Derwirtscaflicheit Von Milchtieren Internationales Abkomen Uber die Methoden der Milchleistung Sprüfungbeikühen. Das Tierzuchtrect in der Bundesrepubik Deutshland. Nbt., pp: 310.

Nobre, P.R.C., J.C. Milagres, A.C.G. Castro and F.A. Fonseca, 1986. Effects of Calving Interval and Dry Period on Milk Yield in the Dairy Herd at the University of Vicosa, Minas Gerais State. Anim. Breed. Abst., 55: 4306.

Özhan, M, N. Tüzemen and M. Yanar, 2001. Büyükbaş Hayvan Yetiştirme. Atatürk Üniversitesi Ziraat Fakültesi. Ders Notu Yayın No: 134, Erzurum.

Raheja, K.L., 1991. Influence of Previous Dry Period, Previous and Present Service Periods on Lactation Milk Yield in Murrah Buffaloes. Indian J. Anim. Sci., 53: 411–415.

SAS, 1996. Users Quide Statistics. SAS Institue Inc., Cary, New York, USA.

Schaefer, L.R. and C.R. Henderson, 1972. Effects of Days Dry and Days Open on Holstein Milk Production. J. Dairy Sci., 55: 107-111.

Stodola, J, F. Hajic and C. Slipka, 1979. The relationship of Postpartum Ýnsemination Interval with Fertility and Milk Production of Cows. Anim. Breed. Abst., 47: 2295.

Tüzemen, N, M. Yanar, Ö. Akbulut and F. Uğur, 1998. Esmer Sıðırlarda Servis Periyodunun Süt Verimi Özelliklerine Etkisi. Doğu Anadolu Tarým Kongresi, Erzurum, Turkey, pp: 786-793.