Analysis Of Season And Parity's Effect On Milk Yield Of Crossbred Dairy Cows At Thamirabarani Command Area

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Abstract

The study was carried out to determine the effect of milk yield due to season parity and stage of lactation in crossbred dairy cows of Thamirabarani command area. Fifty lactating cows belonging to dairy farmers were included in the study and the data were recorded. The study had an average milk yield of 6.16 ± 2.64 Kg per day, milk yield of 1650.74±220.51 Kg per lactation. The values for milk yield among seasons were 2156.35±271.65 and 1540.25±192.35kg for winter and summer, respectively. The parity wise yield were 1878.80±350.95,1976.40±430.25, 2318.00±192.35,2016.05±241.15during first to fourth respectively. Least squares mixed models included calving season (2 classes: Summer (Mar-May), winter (Dec-Feb)), parity number (4 classes: 1, 2, 3 and ≥4) and stage of lactation (3 Classes: early, mid and late). Significant difference in milk yield was noticed due to the effect of season and stage of lactation. Milk yield per lactation and milk yield per day increased from first to third and decreased in fourth. However, first, second, third and fourth parity dams did not differ in milk yield. Cows that calved in the cold season had greater ($p<0.05$) milk yield per day than cows that calved in the summer seasons.

Key words: Effect of season, parity, milk yield

Introduction:

Milk is a nutritious food rich in carbohydrates, protein, fats, vitamins and minerals. It is a good source ofnutrients and hence important for growth, repairs andprovides energy. The milk production for a particular animal will be calculated for entire lactation. The production of milk is also of thegreatest importance for the dairy industry. The variation in milk production is a regular phenomenon in all milking animals; broadly the factors which are responsible for such variations can be divided into Physiological and Environmental, such as age, number of lactations, pregnancy, season of calving, calving interval and nutrition status. The season of calving has a marked effect on the total production. In order to enhance

productivity of a dairy animal, it is necessary to develop an understanding of the factors affecting its milk production and composition. Milk yield and fat percentage are the two important parameters in dairy animals, depends on both genetic and non-genetic factors. Hence, the present study was carried out to find the effect of season and parity on the milk yield of cross bred dairy cows.

Materials & Methods

The data for the study were collected from a total of fifty cross breed cows during the period from December 2016 to April 2017 from different sectors, mini dairy farms and house hold level on Srivaikundam, Thamirabarani command area

Those cows between 7 to 105 days of delivery were classified as early, between 106 to 210 days as mid and those in between 211 to 305 days under late stage of lactation. The data were collected during milking process. The information about the age and parity of cows were obtained from the records available in the farm and from their owners. The weather is divided into winter (December-February) and summer (March-May). An average of 216 mm of annual rainfall is mostly received during the season while the temperature averages 30.5 °C. All study cows used in the present study were in different parity .The parity of the cows were 1^{st} ,2^{nd} ,3^{rd} ,4^{th} and 5^{th} parity. We observed parity in CB cows and variation in the milk yield.

The data on lactation performance records including total milk yield (TMY), daily milk yield (DMY), lactation length (LL) and parity of the crossbred cows were used. Then it was subjected to statistical analysis using the computer program of Statstica. The following general linear statistical model was designed for the analysis:

$$\mathbf{Y_{ijkm} = \mu + s_i + p_j + sp_k + e_{ijkm}}$$

Where, Y_{ijk} = Individual observation for trait Y_{ijk}

μ = Over all mean for trait Y

s_i = Fixed effect of the i^{th} season

p_j = Fixed effect of the j^{th} parity

sp_k = Fixed effect of the k^{th}season x parity interaction

e_{ijkm} = Residual error with zero mean and σ^2 variance

For statistical comparison of differences in amount of milk yield in different categories of independent variables, analysis of variance (ANOVA) was used with a probability of 0.05 used for significant difference.

Result &Discussion

***Calving season effects*:**

Cows that calved during the summer and winter season had an average milk yield of

5.05±2.27 and 7.07±2.53 kg per day respectively. The lactation yield for the cows that calved during winter and summer are 2156.35±271.65 and 1540.25±192.35 kg respectively. It showed a significant difference in milk yield $p<0.05$. Milk yield per day, milk yield per calving interval and efficiency of milk production were significantly greater in cows that calved during the winter season than in those that calved during the summer seasons.

Results fromstudies with Holstein Friesian cows showed that winter calving cows had similar milk yield per lactation to summer calving cows, in conformity with present comparison. [3] and [4]. However, the calving season effect on milk yield per lactation observed in the present investigation is not in agreement with that of [1] who informed that Holstein Friesian cows that calved during the summer season had significantly greater milk yield than those that calved during the winter season. In a recent study performed in Pakistan with imported Holstein Friesian cows from Denmark and their farm-born daughters [2] no effect of calving season on milk yield was observed. For this last study, the values for milk yield among seasons were 3617.50±148.88, 3705.27±168.42, 3607.23±160.54 and 3615.07±151.78 kg for winter, spring, summer and autumn, respectively. Non-significant differences were observed in lactation length between cows that calved during the cold (349±6.1 days), dry (360±6.2 days) and rainy (350±5.7 days) seasons in the current research. The reports on various Holstein Friesian and Brown swiss crossbreds season of calving did not affect lactation length, in conformity with present findings. [2, 8, 9]

***Parity number effects*:**

In general, milk yield per lactation, milk yield per day and milk yield per calving interval increased with increased lactation number. The average yield of the cows on different parity were 6.16±2.79, 6.48±3.05, 7.60±2.27 , 6.61±2.43 and corrected milk yield of different parity were 1878.80±350.95, 1976.40±430.25, 2318.00±192.35, 2016.05±241.15 kg respectively. Cows of first lactation yielded less milk per lactation, per day and were less efficient than second-, third- and fourth-lactation cows and older. Second-lactation cows yielded less milk per lactation, per day and were less efficient than cows of third and fourth lactations and older. Milk yield per lactation, milk yield per day did not significantly differ between any parity cows.

The studies using Holstein Friesian cows, observed that the effect of lactation number on cumulative milk yield at 305 days showed an

identical pattern to that on calving weight and milk yield traits evaluated in the present study[5]. In Holstein Friesian cows under Mexican conditions, observed higher milk production adjusted to 305 days as lactation number increased from one through three[7]. On the contrary, crossbred cows of different Holstein Friesian inheritance, found that first- (4554±469 kg), second- (5427±455 kg) and third-parity dams (5139±441 kg) yielded more milk than fourth-paritydams(2896±430kg) [6].

Table .1 Least squares means and standard errors for Milk Yield per Lactation (MYL), Milk Yield per Day (MYD)

	MYD (Kg)	**MYL (Kg)**
Season	*****	*****
Winter	7.07±2.53[a]	2156.35±271.65 [a]
Summer	5.05±2.27[b]	1540.25±192.35 [b]
Parity		
First	6.16±2.79 [a]	1878.80±350.95 [a]
Second	6.48±3.05 [a]	1976.40±430.25 [a]
Third	7.60±2.27 [a]	2318.00±192.35 [a]
Fourth and above	6.61±2.43[a]	2016.05±241.15 [a]
Stage of lactation	*****	*****
Early	9.46±3.83 [a]	2885.30±268.15 [a]
Mid	6.87±2.57 [b]	2095.35±283.85 [b]
Late	4.14±2.02 [c]	1262.70±116.10 [c]

***** Significant ($p<0.05$) Means bearing same superscript don't differ significantly

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