

Effect of Lactation Length on Milk Yield During First, Second and Third Lactation

**Bajaran Lal Choudhary, Mahesh Datt,
Satya Prakash Yadav, Priyanka Meena,
Pankaj, Sunil Kumar, Vikram Kumar**

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Abstract A field experiment was conducted to study the effect of lactation length on milk yield during first, second and third lactation. The data of 16 F₁ crossbred cows (Th×HF) those had completed three consecutive lactation at the college dairy farm was collected for carrying out the present study. This herd is being maintained dairy farm under semi-arid condition. Data were collected from the record of college dairy farm over a period of eight years (1994-2001). The production performance of 16 F₁ cross-

bred cows maintained in S. K. N. College of Agriculture, Jobner was studied for total lactation milk yield during first, second and third lactation and corresponding lactation length during first, second and third lactation. To estimate the production traits in F₁ crossbred cows in least square estimation method was used for statistical analysis of data to arrive the conclusions. In general, total F₁ crossbred (Th × HF) cows are presented on the college dairy farm. The average milk yield during first, second and third lactations were 2631.91 ± 62.83, 2562.09 ± 59.57 and 2592.39 ± 54.04 in liters respectively. The average lactation length during first, second and third lactations were 373.13 ± 15.09, 363.19 ± 32.19 and 372.50 ± 32.91 in days, respectively. The milk yield during first, second and third lactation varied among different cows. The mean values for third lactation were higher than second lactation but lower than first lactation. The first lactation was highest milk yield and lactation length. Milk yield increases with increasing lactation length. Least square analysis of variance showed that lactation length had significant influence upon lactation milk yield in all crossbred cows. The performance of the F₁ Tharparkar × HF crosses can possibly be the best during first lactation. This could be done to the influence of hybrid vigor that reflected in crossbred cows maintained in tropical climatic condition.

Bajarang Lal Choudhary, Mahesh Datt
Department of Animal Husbandry and Dairy,
S. K. N. College of Agriculture,
Jobner 303329, India

Satya Prakash Yadav, Priyanka Meena, Pankaj
Department of Animal Husbandry and Dairy, IAS, BHU,
Varanasi, India

Sunil Kumar*, Vikram Kumar
Department of Agronomy, IAS, BHU,
Varanasi, India
e-mail : skumar21787@gmail.com
*Correspondence

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Introduction

India is endowed with the largest livestock population in the world. Women constitute about 70% of the labor force in livestock farming. As the ownership of livestock is more evenly distributed among landless laborers and marginal farmers, the progress of these results is in a more balanced development of the rural economy. In global context, the performance of the Indian dairy sector appears impressive in term of livestock population and total milk production but extremely poor in term of productivity. Low milk production in India is probably due to low genetic potential for milk production, poor nutrition management and adverse agro climatic condition. Indian arid zone, where livestock rearing is generally main occupation of rural masses, consists of 12% of country's geographical area and 61% of India's arid zone is Rajasthan. Livestock also provides increased income stability to farm households. It accounts for about 57.30% of the world's buffalo population and 14.70% of the cattle population. Indian dairy industry is contributing significantly to the country's economy, besides improving the health standard by increasing the nutritional value of the food. India occupies first position in the world milk production with 17% share in milk output. India's milk production increased from 17.00 million tonnes in 1950-51 to 140.00 million tonnes during 2014-15 (NDDDB, 2015) and the demand is expected to be 180 MT by 2020. In 1970 under the aegis of NDDDB (National Dairy Development Board) Operation Flood Program was launched to modernize the dairy sector flood the 4 metro cities with milk from dairy co-operatives.

The cross breeding of nondescript Indian cattle on the field scale started in 1964 with the launch of the Intensive Cattle Development Projects (ICDP) of the Government of India and by 1969 it become the official policy of the government of India for increasing milk production. The pioneering work on the large scale cross breeding in different parts of India by Bhartiya Agro-Industries Foundation (BAIF) all through the seventies, validate the positive impact of cross breeding on milk production, and unequivocal recommendation of the National Commission on Agriculture (NCA) in 1974 that cross breeding should be a major strategy for increasing

milk production in India, laid all adverse criticism to rest and legitimized crossbreeding as a powerful tool to rapidly enhance milk production.

The government had no intention to crossbred pure Indian breeds of cattle. But in actual practice, the spectacular increase in milk yields in the crossbred progenies generated overwhelming demand for crossbred cattle from farming community almost all over India and necessitated the expansion of the program nationwide even to the home tracts of the pure Indian breeds. While most states had been totally indifferent in managing the breeding policy as prescribed and while no attempt was made by most states to produce proven half bred bulls.

Materials and Methods

This chapter describes the methodology adopted in selection of study area, collection, tabulation and analysis of the data. The study is exploratory in nature and prime aim to know the lactation length, total milk yield and effect of lactation length on total milk yield in Tharparker \times HF F_1 crossbred cows maintained at dairy farm of S.K.N. College of Agriculture, Jobner (Jaipur).

Data collection

Selection of study area

College dairy farm was selected to carry out the proposed investigation. The study area was confined to college dairy farm, S. K. N. College of Agriculture, Jobner (Jaipur) where the work of crossbreeding was started in the year 1991-1992 after transferring young Tharparkar heifers from Livestock Research Station, Chandan (Jaisalmer). After attaining puberty, these heifers were inseminated with frozen semen of Holstein Friesian bulls. All F_1 crossbred cows were having 50% exotic inheritance and were maintained under semi-arid conditions. The data on total lactation milk yield and lactation length related to Tharparkar \times Holstein Friesian (Th \times HF) F_1 crossbred cows was maintained at college dairy farm.

Collection of data

Table 1. Effect of lactation length on milk yield during first, second and third lactation.

Cow	Lactation length in first, milk yield in first, second and third lactation in liters days					
	I	II	III	I	II	III
1	317	332	307	3509.40	3869.02	3438.40
2	367	345	393	3350.80	3532.00	4231.80
3	345	374	381	2610.00	1565.60	1874.40
4	337	345	409	2061.60	2547.20	2217.40
5	337	359	400	3964.60	3167.40	2943.40
6	403	292	310	2557.60	2603.80	3814.20
7	298	368	370	2372.60	2676.20	2422.40
8	347	359	351	2472.20	2178.60	1911.18
9	368	321	331	5002.00	5605.40	3892.70
10	377	498	337	1804.60	1946.60	2359.80
11	580	365	471	2520.00	2730.00	2261.10
12	351	294	283	2942.40	3001.40	2878.20
13	406	351	333	3590.00	2379.00	2131.60
14	305	316	489	3884.60	2845.40	3610.00
15	563	498	447	2987.40	3207.60	3997.20
16	269	392	348	1744.60	2262.40	2679.20
Total	5970.00	5809.00	5960.00	47374.40	46117.62	46662.98
Mean	373.13	363.06	372.50	2631.91	2562.09	2592.39
SEm±	15.09	32.19	32.91	62.83	59.57	54.04
CD ($p=0.05$)	38.03	81.13	82.94	158.35	150.14	136.18

The data of 16 F_1 (Tharparkar \times Holstein Friesian) crossbred cows that had completed three consecutive lactations at the college dairy farm, was collected for carrying out the present study.

Observations under taken

Data was collected from the records of college dairy farm from 1994-2001. There were 16 crossbred cows whose data on lactation performance and lactation length was available at college dairy farm. Data related to Tharparkar \times Holstein Friesian F_1 crossbred cows on total lactation milk yield during first, second and third lactation and their corresponding lactation length was collected from the records of college dairy farm over a period of eight years (1994-2001).

Statistical analysis

To estimate the production traits in F_1 crossbred cows, the least square estimation method was used for statistical analysis of data [1].

Results and Discussion

In the present study, total milk yield and lactation length of 16 F_1 (Tharparkar \times Holstein Friesian) crossbred cows were studied during first, second and third lactation. The total milk yield and lactation length during first, second and third lactation varied among different cows.

The Table 1, shows that the mean values of total milk yield and lactation length during first, second and third lactation were 2631.91 ± 62.83 , 2562.09 ± 59.57 and 2592.39 ± 54.04 liters respectively and 373.13 ± 15.09 , 363.19 and 372.50 ± 32.91 days respectively. The table also reveals that total lactation milk yield and lactation length values during first lactation were highest.

This reflects the effect of favorable genes among the F_1 (Tharparkar \times Holstein Friesian) crossbred cows. Ahmed et al. [2] also found milk yield for two groups was significantly affected by parity and year and the regression of this trait on age at first calving and lactation length were significant. Bhoite et al. [3] also found the milk yield per day of calving interval had significant correlation with lactation length, dry period, service period and calving inter-

val. Least square analysis of variance showed that the effect of genetic group was significant on first lactation total milk yield and lactation length. The performance of F_1 (Tharparkar \times Holstein Friesian) crosses was found to be superior in total milk yield and lactation length in first lactation. This can possibly be due to effect of favorable genes. Further, Parity differences were also also significant on first lactation total milk yield and lactation length.

The data pertaining to mean lactation length and milk yield during second and third lactation were 2562.09 ± 59.57 and 2592.39 ± 54.04 liters and 363.19 and 372.50 ± 32.91 days. The Table 1 reveals that the milk production performance of F_1 (Tharparkar \times Holstein Friesian) crossbred cows during second and third lactation was lower than first lactation performance because first lactation had higher lactation length as compared to second and third lactation. Least square analysis of variance showed that parity had significant influence upon total milk production during second and third lactation.

The lower milk production performance of F_1 (Tharparkar \times Holstein Friesian) crossbred cows during second and third lactation may be due to genetic difference between lactation. Table 1 reveals that mean values for second lactation length were 363.19 ± 32.19 days. Total lactation milk yield was significantly affected by lactation length during second lactation. [4] found that lactation number had no effect on milk yield. Whereas Das et al. [5] studies crossbred record and reported that year season parity had no significant influenced upon lactation yield or length in two groups. Facio et al. [6] found that milk yield in different genetic groups increase with increasing lactation length. Similar results were reported by Hossen et al. [7] in Jersey \times Haryana crossbred cows. [8] Found that lactation length was positively correlation with daily milk yield and lactation milk yield in three different groups [9].

Table 1 also reveals that mean values for total lactation milk yield and lactation length for third lactation in F_1 (Tharparkar \times Holstein Friesian) crossbred cows were 2592.39 ± 54.04 liters and 372.50 ± 32.91 days. The mean values for third lactation were

higher than second lactation but lower than first lactation. Least square analysis of variance showed that lactation length had significant influence upon total lactation milk yield [10]. The performance of F_1 (Tharparkar \times Holstein Friesian) crosses was found to be superior during first lactation. This could be due to larger number of gene pairs interacting in its inheritance and expression Holstein Friesian is a well-known productive breed in the world and when crosses is done between a low producer breed like Tharparkar, the performance of first generation improved to heterotic superiority. It has been reported by large number of research markers that if the crossbreeding program is not checked. The production advantage of recombination loss, that lead breakdown of heterotic superiority in subsequent generation. This had to insufficient adaptation which is manifested in the decline in performance. In order to maintain milk production in subsequent lactations several factors like body condition season of calving feeding management may be responsible in crossbreds.

References

1. Petraskiene R, Peculaitiene N, Jukna V (2013) Crossbreeding influence of dairy breeds cattle on average of lactation length and on average of productivity. *Veterinarijair Zootechnika* 64: 65—69.
2. Ahmed MKA, Teirab AB, Musa LMA, Peters KJ (2007) Milk production and reproduction traits of different grades of Zebu \times Friesian crossbreds under semi-arid conditions. *Archiv für Tierzucht* 50: 240—249.
3. Bhoite UY, Fulpagare YG, Bhoite SU (2010) Milk production performance of Phule Triveni crossbred cows under cows under field conditions. *J Maharashtra Agric Univ* 35: 443-445.
4. Bordoloi JP, Haque A, Baruah DK (2006) Performance of crossbred dairy cows in different categories of household in Guwahati. *Tamilnadu J Vet and Anim Sci* 2: 148—150.
5. Das GC, Das D, Goswami RN, Roy TC, Nahardeka N (2009) Factors affecting some production traits in Jersey, Red Sindhi and their crosses in Assam. *Ind Vet J* 80: 126—127.
6. Facio O, Martins FR, Lobo RNB, Azevedo DMMR, Oliveira SMP (2009) Effect of reduction of lactation length variation on genetic evaluation of crossbred dairy cattle. *Revista Ciencia Agron* 40: 1217—1220.
7. Hossen MS, Hossain SS, Bhuiyan AKFH, Hoque MA, Talukder MAS (2012) Comparison of some important dairy traits of crossbred cows at Baghabarighat milk shed area of Bangladesh. *Bangladesh J Anim Sci* 41: 13—18.
8. Komatwar SJ, Deshpande AD, Kulkarni MD, Yadav GB, Khanvilkar AV (2009) Analysis of production traits in

- HF Sahiwal crossbreds by Duncan's multiple range test. *Ind J Anim Prod and Manag* 25 : 91—93.
9. Madhuri SB, Suman CL, Pandey HS (2009) Reproduction and production performance of three-breeds cross in cattle. *Ind J Anim Res* 43 : 32—36.
10. Auldish MJ, Brien G, Macmillan KL, Grainger C (2007) Effects of varying lactation length on milk production capacity of cows in pasture-based dairying systems. *J Dairy Sci Elsevier, Australia* 90 : 3234—3241.