

Evaluation of Ten Sire Families of Crossbred Dairy Cattle of Kerala Based on Milk Production and Milk Composition Traits

Naicy Thomas and Anilkumar, K.

Centre for Advanced Studies in Animal Genetics and Breeding,
College of Veterinary and Animal Sciences, Mannuthy, Thrissur, Kerala

Abstract

Data on production performance of 200 animals maintained at University Livestock Farm, Kerala Agricultural University, Mannuthy and Cattle Breeding Farm, Thumburmuzhi were used for the study. Among the eight economically important traits [305 day milk yield, fat percentage, protein percentage, SNF(Solids not fat), total solids, peak yield, days to attain peak yield and AFC(Age at first calving)], milk fat percentage and AFC had significant difference among the families. The families of Deva, Bull No.250 and Hakkim showed significantly lower milk fat percentage compared to the other seven families. The AFC of the families of Dipesh, Onkar and Gopal was significantly higher from the other seven sire families.

Keywords: Sire, Crossbred, Dairy Cattle, Milk, Production, Composition, Trait, Family, Evaluation, Milk yield.

Introduction

The tropical *Bos indicus* cattle are poor in milk production and their improvement was attempted through various strategies. The introduction of *Bos taurus* genes through crossing the native cows with exotic bulls was tried in India, as early as 1945. Later on introgression of taurus genes was accepted as one of the quickest means of improvement in production traits of tropical dairy cattle. But for sustaining and improving the quantum jump in milk production, stringent selection methods are necessary. The milk production of the crossbred cattle in Kerala has remained more or less stagnant during the past few decades. Experts believe that problems with bull selection are the major hot spot.

Materials and Methods

Milk samples were collected from 200 animals maintained at the University Livestock Farm, Mannuthy and Cattle Breeding Farm, Thumburmuzhi and analysed for total solids, fat (IS: 1224, 1977), protein (AOAC, 1990, N* 6.38), and solids not fat (SNF). Data regarding milk yield, age at first calving, peak yield and days to attain peak yield of each animal were collected from the records maintained at University Livestock Farm, Mannuthy and Cattle Breeding Farm, Thumburmuzhi.

One way analysis of variance was done to find out the effect of sire families on eight economic traits,

viz. milk yield, fat percentage, protein percentage, SNF, total solids, peak yield, days to attain peak yield and AFC, using the method of Snedecor and Cochran (1985).

Results and Discussion

Names of the bulls and their daughter averages for milk production traits, AFC and milk composition traits are presented in Table 1 and 2. The population averages for different economic traits are presented in Table 3.

1. 305 Day Milk Yield: Among the sire families the highest milk yield was recorded for the family of Devan (2480.2±123 kg) and the lowest for the family of Hakkim (1860.3±289 kg). Analysis of variance for effect of sire families on 305 day milk yield is presented in Table 4.30, which showed no significant difference between the sire families. The population average for 305 day milk yield was 2070.5±59.1 kg. This was similar to that obtained by Radhika (1997).

2. Milk Fat Percentage: A significantly lower fat percentage was observed for the families of Deva (3.13±0.2), Bull no. 250 (2.83±0.2) and Hakkim (3.58±0.4). The average milk fat percentage of crossbred dairy cattle population in the study was 3.738±0.0788. A report by Radhika (1997) stated a milk fat percentage of 3.67±0.12 and 3.96±0.152 during mid lactation in Cattle Breeding Farm, Thumburmuzhi and University Livestock Farm, Mannuthy. Since the present population included the

Table-1. Names of the bulls and their daughter averages for 305 day milk yield, Peak yield, Days to attain Peak yield and Age at First Calving (AFC)

No.	Bull	Progeny performance			
		305 day milk yield(kg)	Peak yield (kg)	Days to attain PeakYield	AFC (days)
1	Deva	2188.7±144	11.2±0.5	15.5±4.19	1043±18 a
2	Oscar	2073.6±850	11.1±1.1	18.75±3.4	975±95 a
3	Bull.250	1961.6±291	13.4±0.6	27.0±9.40	1002±25 a
4	Debu	2111.8±131	12.3±1.6	18.0±3.30	956±49 a
5	Deven	2480.2±123	12.6±0.8	22.0±4.32	1079±29 a
6	Hakkim	1860.3±289	12.13±1	17.0±2.10	1011±32 a
7	Dipesh	2221.5±387	10.9±0.5	24.0±7.10	1145±52 b
8	Onkar	1945.7±207	12.5±0.2	26.0±5.70	1233±73 b
9	Dara	2284.1±322	13.8±1.9	50.4±14.1	1076±57 a
10	Gopal	2059±325.5	13.1±1.1	26.0±5.30	1226±84 b

Means bearing same superscripts do not differ significantly (p<0.05)

animals from both farms, the average value is approximately equal to the average value reported by Radhika (1997). This indicates that the milk fat percentage has remained stagnant for past eight years. A significantly lower fat percentage was observed for the families of Deva (3.13±0.2), Bull no.250 (2.83±0.2) and Hakkim (3.58±0.4). The milk fat percentage of the former two were below the Prevention of Food Adulteration (PFA) standards.

3. Milk Protein Percentage: The highest protein percentage was recorded for the family of Oscar (2.97±0.14) and the lowest for the family of Deva (2.62±0.08). Analysis of variance for protein percentages showed no significant difference among the sire families.

4. Percentage of Total Solids in Milk: The highest total solids percentage was observed for the family of Dipesh (12.71±0.5) and the lowest for the family of the bull, 250 (11.18±0.3). Analysis of variance for total

solids percentages showed no significant difference among the ten sire families.

5. SNF Percentage: Among the ten sire families the analysis of variance revealed no significant difference for SNF percentage.

6. Peak Yield: The highest peak yield of 13.8±1.9 kg was recorded for the family of Dara and the lowest for the family of Dipesh (10.9±0.5 kg). But the analysis of variance for peak yield did not show any significant difference among the ten sire families. The population average for the peak yield was 11.858±1.141 kg.

7. Days to Attain Peak Yield: The highest daughter average for the days to attain peak yield was for the family of Dara (50.4±14.1 days) and the lowest was for the family of Deva (15.5±4.19 days). The analysis of variance for days to attain peak yield revealed no significant difference among the families.

8. Age at First Calving: Analysis of variance revealed a significantly higher AFC for the families of Dipesh

Table- 2. Names of the bulls and their daughter averages for Fat %, Protein %, SNF % and Total solids %

No.	Bull	Progeny performance			
		Fat %	Protein %	SNF %	Total solids %
1	Deva	3.13±0.2 b	2.62±0.08	8.40±0.20	11.52±0.28
2	Oscar	4.4±0.20 a	2.97±0.14	8.44±0.24	12.5±0.300
3	Bull.250	2.83±0.2 b	2.71±0.96	8.34±0.30	11.18±0.24
4	Debu	4.25±0.3 a	2.92±0.10	8.20±0.30	12.43±0.40
5	Deven	4.03±0.2 a	2.78±0.20	8.36±0.16	12.39±0.11
6	Hakkim	3.58±0.4 b	2.83±0.17	8.50±0.40	12.07±0.80
7	Dipesh	4.2±0.28 a	2.87±0.07	8.52±0.29	12.71±0.50
8	Onkar	4.03±0.3 a	2.77±0.18	8.43±0.31	12.46±0.54
9	Dara	3.8±0.46 a	2.73±0.07	8.30±0.27	12.02±0.70
10	Gopal	3.7±0.34 a	2.64±0.14	8.28±0.12	11.96±0.30

Means bearing same superscripts do not differ significantly (p<0.05)

Table - 3. Averages for milk production and milk composition traits in crossbred cattle population

Sl. No.	Parameter	Population average
1	305 day milk yield(kg)	2070.5± 59.1
2	Peak yield (kg)	11.858±1.141
3	Days to attain Peak Yield	24.304±1.88
4	Age at First Calving (days)	1077.43±11.55
5	Fat %	3.738±0.0788
6	Protein%	2.781±0.0286
7	SNF%	8.456±0.0053
8	Total solids%	12.191±0.097

(1145±52 days), Onkar (1233±73 days) and Gopal (1226±84 days). The population average for AFC was 1077.43±11.55 days. Analysis of variance revealed a significantly higher AFC for the families of Dipesh, Onkar and Gopal. In the present study, the AFC of crossbred cows varied from 956±49 days to 1233±73 days.

Conclusion

Data on production performance of 200 animals maintained at University Livestock Farm, Kerala Agricultural University, Mannuthy and Cattle Breeding Farm, Thumburmuzhi were analysed for 305 day milk yield, fat percentage, protein percentage, SNF(Solids not fat), total solids, peak yield, days to attain peak yield and AFC(Age at first calving), milk fat percentage and AFC. The population average for 305 day milk yield was 2070.5±59.1 kg. The average milk fat percentage of crossbred dairy cattle population in the study was 3.738±0.0788. The population average for the peak yield was 11.858±1.141 kg. The population average for AFC was 1077.43±11.55 days. Among the eight economically important traits (milk yield, fat percentage, protein percentage, SNF, total solids, peak yield, days to attain peak yield and AFC), milk fat percentage and AFC had significant difference among the families. The

families of Deva, Bull No.250 and Hakkim showed significantly lower milk fat percentage compared to the other seven families. The AFC of the families of Dipesh, Onkar and Gopal was significantly higher from the other seven sire families.

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References

1. AOAC. (1990). *Official method of analysis*. 13th Edn. Association of official analytical chemists. Washington, D.C.: 587
2. IS: 1224. (1977): Determination of fat by Gerber's method. Part. I. Milk (First revision). Indian Standards Institution, New Delhi. : 18
3. Radhika, G. (1997): Evaluation of Holstein crossbred bulls based on milk composition of progeny. M. V. Sc. Thesis, Kerala Agricultural University, Thrissur.: 97
4. Snedecor, G. W. and Cochran, W. G. (1985): *Statistical methods*. 7th Edn. The Iowa State University Press, USA.: 313

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