Int.J.Curr.Microbiol.App.Sci (2018) Special Issue-6: 1585-1589

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7692 **Special Issue-6 pp. 1585-1589**
Journal homepage: http://www.ijcmas.com

Original Research Article

Studies on Persistency of Milk Yield and Its Association with Production Traits in Phule Triveni Synthetic Cow

S.R. Garudkar*, S.T. Pachpute and D.K. Deokar

Department of Animal Science and Dairy Science, Mahatma Phule Krishi Vidyapeeth, Rahuri, India
**Corresponding author*

A B S T R A C T

The data pertaining to study of non-genetic factors on persistency of milk yield of 996 lactations of Phule Triveni synthetic cows, maintained at Research Cum Development Project on Cattle, Mahatma Phule Krishi Vidyapeeth, Rahuri for the period from 1991-2008. The overall least squares means for persistency of milk yield was 11.00 ± 0.71. The period of calving and pre-peak period had highly significant effect (P<0.01) on persistency of milk yield. The persistency of milk yield was positively and significantly (P<0.01) correlated with lactation milk yield and lactation length but non-significantly correlated with peak yield.

Keywords

Phule Triveni, Persistency, Peak yield, Pre-peak period

Introduction

The persistency of milk yield is of economical interest to dairy farmers as it is closely associated with total milk production in cows. Persistency, peak yield and lactation length are the major components affecting total lactation milk yield in dairy animals. Persistency can be defined as "the extent to which peak yield is maintained."

An animal with high persistency index is good producer of milk which is supposed to be kept in herd. Therefore, it acts as an important tool for selection. Though the majority of studies on persistency have investigated the effect of period, season, parity and age group at first calving on persistency of milk yield, the effect of pre-peak period on persistency has not been studied in greater details, by research worker so far. Hence, an attempt has been made to study these aspects of persistency of milk yield and its association with production traits in Phule Triveni synthetic cow.

Materials and Methods

The collected data were classified according to period of calving, season of calving, parity and age at first calving and analyzed by least square analysis techniques (Harvey, 1990). The following mathematical model was used;

$$Y_{ijklmn} = \mu + P_i + S_j + L_k + A_l + B_m + e_{ijklmn}$$

Y_{ijklmn} = Observation on the n^{th} traits belonging to i^{th} period of calving, j^{th} season of calving, k^{th} parity, l^{th} pre-peak period, m^{th} age at first calving group

μ = Overall mean

P_i = Effect of i^{th} period of calving

S_j = Effect of j^{th} season of calving

L_k = Effect of k^{th} parity

A_l = Effect of l^{th} pre-peak period group

B_m = Effect of m^{th} age at first calving group

e_{ijklm} = Random error associated with NID with $(0,\sigma 2e)$

The method developed by Mahadevan (1951) was used for estimation of persistency of milk yield.

$$P = \frac{A - B}{B}$$

Where,

P = Persistency of milk yield

A = Total lactation milk yield

B = Initial milk yield up to attainment of peak yield

The Duncan's Multiple Range Test (DMRT) as modified by Kramer (1957) was used to make pair wise comparison among the least squares means of various traits.

The correlations among different milk production trait were studied as per the technique of Snedecor and Cochran (1994).

Results and Discussion

The analysis of variance and least squares means for persistency of milk yield are presented in following Table 1, 2 and the correlation between persistency and peak yield depicted in Table 3.

Persistency

The overall least squares means for persistency of milk yield was estimated as 11.00 ± 0.71 in Phule Triveni synthetic cow.

Effect of period of calving

The analysis of variance revealed the significant effect ($P<0.01$) of period of calving on persistency of milk yield in present study, which was supported by Singh *et al.,* (2000) and Kumar and Singh (2006a) in Karan Fries cattle. The DMRT revealed that the persistency of milk yield during (1994-1996) was significantly lower than the other periods.

Effect of season of calving

The effect of season of calving on persistency of milk yield was non-significant. Similar results were reported by Koley *et al.,* (1979) in J × H crossbred cows, Gupta and Johar (1982) in Tharparkar cows, Singh and Shukla (1985) in Gir cattle, Roy and Katpatal (1987) and Patond (2009) in Jersey cattle. However, irrespective of statistical significance the cows calved during rainy season had higher persistency (11.40 ± 0.85) than those calved during summer (11.15 ± 0.84) followed.

Effect of parity

The effect of parity was non-significant on persistency of milk yield in the present investigation.

Table.1 Analysis of variance for persistency of milk yield in Phule Triveni synthetic cow

Source of Variance	d.f.	S.S.	M.S.S.	Fcal.
Period of calving	5	1187.00	237.40	5.33**
Season of calving	2	80.20	40.10	0.90
Parity	4	114.77	28.69	0.64
Age at first calving	2	195.29	97.64	2.19
Pre-peak period	2	2647.54	1323.77	29.75**
Error	486	21623.97	44.49	-

(** = P < 0.01)

Table.2 Least squares means for persistency of milk yield in Phule Triveni synthetic cow

Effects	N	Persistency (kg)
Overall (μ)	**502**	**11.00 ± 0.71**
Period of calving		
1991-1993	71	10.26^{a} ± 1.12
1994-1996	124	7.89^{b} ± 0.84
1997-1999	95	11.28^{a} ± 0.90
2000-2002	92	12.19^{a} ± 0.98
2003-2005	60	11.76^{a} ± 1.13
2006-2008	60	12.64^{a} ± 1.14
Season of calving		
Rainy	147	11.40 ± 0.85
Winter	186	10.45 ± 0.80
Summer	169	11.15 ± 0.84
Parity		
L_1	193	10.37 ± 0.77
L_2	132	11.03 ± 0.85
L_3	87	11.13 ± 0.93
$^{L}4$	55	11.95 ± 1.12
L_5	35	10.53 ± 1.34
Age at first calving group		
Up to 30 months	105	11.86 ± 0.94
31-35 months	180	11.09 ± 0.85
>35 months	217	10.05 ± 0.77
Pre-peak period		
1-30 days	238	14.32^{a} ± 0.53
31-60 days	250	9.41^{b} ± 0.48
>60 days	14	9.28^{b} ± 1.87

Means with different superscripts differ significantly from each other

Table.3 Estimates of genetic correlation between persistency and production traits in Phule Triveni synthetic cow

Production Traits	No. of Observations	Persistency of Milk Yield
Total milk yield	502	0.302 **
Peak Yield	502	0.030
Lactation Length	502	0.203 **

However, persistencies of milk yield were increasing trend from parity L_1 to L_4 successively. Similar results were reported by Singh and Gopal (1982) in Rathi, Shahare *et al.,* (1988) in HF × Hariana, J × Sahiwal, J × Gaolao and HF × Gaolao and Patond (2009) in Jersey cattle.

Effect of age at first calving group

The effect of age at first calving group was non-significant on persistency of milk yield. The results indicated the decline trend in persistency with advanced AFC. Similar results were reported by Gill *et al.,* (1970) in Hariana cattle, Koley *et al.,* (1979) in J × H crossbred cows, Gupta and Johar (1982) in Tharparkar cows, Gawari (1999) in FJG, BFG and JFG triple crossbred cattle, Kumar and Singh (2004) in Karan Fries and Patond (2009) in Jersey cattle.

Effect of pre-peak period

Pre-peak period had significant effect of ($P < 0.01$) on persistency of milk yield in the present investigation. The results observed that the least square means for 1 to 30 days pre-peak period had maximum persistency of milk yield (14.32 ± 0.53). Similar results were reported by Kumar and Singh (2006b) in Karan Fries cattle.

Correlations

The persistency of milk yield was positively and significantly ($P<0.01$) correlated with lactation milk yield and lactation length but, non-significantly correlated with peak yield (Table 3). Similar results were reported by Koley *et al.,* (1979), Kumar and Singh (2006b) in Karan Fries and Patond (2009) in Jersy cattle.

The significant effect of period of calving on persistency indicated that the response of animals to varied environmental conditions including feeding, management and changing population dynamics due to selection pressure and culling. The positive genetic correlation indicated that any increase in persistency of milk yield would simultaneously bring about an increase in total milk yield which could be due to the same set of genes responsible for the expression of these traits.

Acknowledgments

The authors acknowledge with thanks Dr. D. K. Deokar, Assistant Dairy Cattle Breeder and all staff members of Research Cum Development Project on Cattle (RCDP) for providing the required data of Phule Triveni synthetic cows from the record maintained at RCDP and their unreserved collaboration. Appreciation is also expressed to Prof. B. B. Khutal for his continuing guidance and valuable comment.

References

Gupta, R.N. and Johar, K.S. 1982. Genetic and non-genetic factors affecting persistency of first lactation in Tharparkar. Indian J, Dairy Sci. 35 (1):

99-101.

Harvey, W.R. 1990. Least squares analysis of data with unequal subclasses number. USD. ARS. 20: 8.

Koley, N., Chaudhary, G. and Mitra, D.K. 1979. Persistency of lactation yield in Jersey, Hariana crossbred cows. Indian

Kramer, C.V. 1957. Extension of multiple range test to group correlated adjusted mean. Biometrix 13: 13-20.

Kumar, A. and Singh, A. 2006a. Genetic and Environmental factors influencing persistency of milk production in Karan Fries cattle. Indian J. Anim. Res. 40 (2): 95-100.

Kumar, A. and Singh, A. 2006b. Genetic evaluation of persistency of milk production and its association with production and reproduction traits in Karan Fries cattle. Indian J. Dairy Sci. 59 (1): 19-24.

Mahadevan, P. 1951. The effect of environment and heredity on lactation. II. Persistency of lactation. J. Agric. Sci. 41: 89-93.

Patond, M.N. 2009. Persistency of milk yield in Jersey cattle. M.Sc. (Agri).Thesis, M.P.K.V., Rahuri (India).

Roy, T.C. and Katpatal, B.G. 1987. Genetic studies on persistency of first lactation milk yield in Jersey cattle. Livestock Adviser 12 (8): 17-23.

Shahare, R.B., Ali, S.Z. and Tingare, S.B. 1988. Genetic and non-genetic factors affecting persistency of lactation in crossbred cows. Indian J. Anim. Prod. Mgmt. 4 (1): 36.

Singh, J. and Shukla, K.P. 1985. Factors affecting persistency of milk production in Gir cattle. Indian Vet. J.62 (10): 888-894.

Singh, K., Khanna, A.S. and Kanaujia, A.S. 2000. Factors affecting lactation performance and persistency in crossbred cattle. Indian J. Dairy Sci. 53 (5): 354-360.

Singh, R.P. and Gopal, R. 1982. Persistency and peak yield of cattle in rural area. Indian J. Anim. Sci. 52 (7): 487-489.

Snedecor, G.W. and Cochran, W.G. 1994. Statistical methods 8th edition Oxford and IBH publishing Co. New Delhi.