



## Studies on peak yield and days to attain peak yield in jersey cattle

M.N. PATOND, B.B. KHUTAL, S.T. PACHPUTE AND S.S. RAMOD

**ABSTRACT :** The data on peak yield and days to attain peak yield in the first four lactations of Jersey cattle were utilized for this study. The present investigation was carried out on 251 Jersey cows maintained at Bull Mother Farm Tathawde, Pune over a period of 10 years (1996-2005). The overall least square means for peak yield and days to attain peak yield in Jersey cattle were,  $13.10 \pm 0.37$  kg and  $21.41 \pm 0.46$  days, respectively. Significant ( $P < 0.01$ ) effect of period of calving on peak yield was observed in Jersey cattle, whereas the effect of period of calving on days to attain peak yield was non-significant. The effect of season of calving was non-significant for peak yield. However significant ( $P < 0.05$ ) effect of season of calving was observed on days to attain peak yield in Jersey cattle. The effect of lactation order on peak yield and days to attain peak yield was non-significant in the present study. The heritability estimates for peak yield and days to attain peak yield were  $0.20 \pm 0.13$  and  $0.30 \pm 0.10$ , respectively. The repeatability estimates for peak yield and days to attain peak yield were  $0.52 \pm 0.10$  and  $0.19 \pm 0.09$ , respectively in Jersey cattle.

**KEY WORDS :** Peak yield, Days to attain peak yield, Jersey cattle

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### INTRODUCTION

Peak yield is the maximum milk yield in a day during the lactation and can be used as criteria for early selection of cows. Peak yield and days to attain peak yield has a high correlation with total milk yield and such selection based on peak yield and days to attain peak yield would reduce the generation interval. In the present study an attempt has been made to study the peak yield and days to attain peak yield of first four lactations of Jersey cattle.

### MATERIAL AND METHODS

The data of 251 Jersey cows maintained at Bull Mother Farm Tathawde, Pune over a period of 10 years (1996-2005) were used for the study. Period of 10 years was divided into 2

periods of 5 years each ( $P_1$  and  $P_2$ ). The year was subdivided into 3 seasons i.e. Rainy ( $S_1$ ) June-September, Winter ( $S_2$ ) October-January and Summer ( $S_3$ ) Feb- May. Order of lactation was considered up to 4<sup>th</sup> lactation and coded as  $L_1$  to  $L_4$ .

#### Least squares analysis:

In order to overcome non orthogonal data resulting from unequal number of observations and disproportionate subclass frequencies and to study the various non-genetic factors, the least squares technique (Harvey, 1991) by fitting constants was used. For estimation of the effect of non-genetic factors, the following biometrical model was used.

#### Least squares analysis of variance for non-genetic factors:

$$Y_{ijklm} = \mu + P_i + S_j + L_k + e_{ijklm}$$

where,

$Y_{ijklm}$  = Peak milk yield and days to attain peak milk yield value of the  $m^{\text{th}}$  animal belonging to  $i^{\text{th}}$  period of calving,  $j^{\text{th}}$  season of calving and  $k^{\text{th}}$  lactation order

$\mu$  = Overall mean,

$P_i$  = Effect of  $i^{\text{th}}$  period of calving, ( $i = 1, 2$ ),

$S_j$  = Effect of  $j^{\text{th}}$  season of calving ( $j = 1, 2, 3$ ),

$L_k$  = Effect of  $k^{\text{th}}$  lactation order, ( $k = 1, 2, 3$  and  $4$ ),

$e_{ijklm}$  = Random error, NID with mean and variance ( $0, d^2e$ )

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, respectively.

## RESULTS AND DISCUSSION

The experimental findings of the present study have been presented in the following sub heads:

### Peak yield:

The least square means for peak yield was  $13.10 \pm 0.37$  kg in the present study (Table 1). Similar findings of peak yield ( $13.36 \pm 0.14$  kg) were reported by Ramchandraiah *et al.* (1990) in Jersey cattle. However, slightly lower values ( $11.88 \pm 0.46$  kg) of peak milk yield were reported by Roy and Katpatal (1988) in Jersey cattle.

### Effect of period of calving:

Significant ( $P < 0.01$ ) effect of period of calving on peak yield was observed in present study. The t test revealed that, the peak yield during  $P_2$  was significantly higher than  $P_1$  period. The results obtained were in consonance with the findings of Singh *et al.* (1989) in HF, Jersey Brown Swiss cattle.

### Effect of season of calving:

The differences associated with season of calving were non-significant for peak yield in Jersey cattle. Similar results were reported by Rao and Sunderson (1982) in HF  $\times$  Sahiwal cattle.

### Effect of lactation order:

The effect of lactation order on peak yield was non-significant in the present study. However, Palia and Arora (1982) reported significant effect of lactation order on peak yield in Jersey cattle.

### Heritability estimate:

Heritability estimate for peak yield in present study was

$0.20 \pm 0.13$ . Higher value of heritability for peak yield were reported by Roy and Katpatal (1987) in Jersey and Kumar *et al.* (1992) in Haryana cattle.

### Repeatability estimate:

The repeatability reported in the present investigation was  $0.52 \pm 0.10$  in Jersey cattle. Higher estimate of repeatability was reported by Agasti *et al.* (1988) in J  $\times$  Haryana cattle. Whereas, lower estimates were observed by Gill *et al.* (1971) and Rao and Sunderson (1982) in Haryana and HF  $\times$  Sahiwal cattle, respectively.

### Days to attain peak yield:

The overall least squares means for days to attain peak yield were  $21.41 \pm 0.46$  days in Jersey cattle. Higher values for days to attain peak yield were reported by Patil (1989) and Krishna *et al.* (1991) in HF  $\times$  Gir, HF  $\times$  Deoni crossbred cattle.

### Effect of period of calving:

The least squares analysis of variance for days to attain peak yield revealed that, the period of calving had non-significant effect on this trait in Jersey cattle. Similar non-significant results were reported by Patil (1989) of period of calving on days to attain peak yield in HF  $\times$  Gir cattle.

### Effect of season of calving:

Least squares analysis of variance showed significant ( $P < 0.05$ ) effect of season of calving on days to attain peak yield in present investigation. These findings are in agreement with Singh *et al.* (1989) in Haryana halfbreeds with HF, Jersey and BS cattle.

### Effect of lactation order:

Effect of lactation order was non-significant on days to attain peak yield in Jersey cattle. Whereas, Ramachandraiah

**Table 1 : The least squares means for peak yield and days to attain peak yield of mil yield in jersey cattle.**

Source of variation	Code	No. of observations	PY (kg)	DAPY (days)
Overall	$\mu$	526	$13.10 \pm 0.37$	$21.41 \pm 0.46$
<b>Period of calving</b>				
1996 – 2000	$P_1$	289	$12.16 \pm 0.79^b$	$21.08 \pm 0.99$
2001 – 2005	$P_2$	237	$14.04 \pm 0.47^a$	$21.74 \pm 0.59$
<b>Season of calving</b>				
Rainy	$S_1$	170	$12.19 \pm 0.67$	$20.22 \pm 0.84^b$
Winter	$S_2$	182	$13.49 \pm 0.53$	$23.43 \pm 0.67^a$
Summer	$S_3$	174	$13.63 \pm 0.54$	$20.58 \pm 0.68^b$
<b>Order of lactation</b>				
1 <sup>st</sup> Lactation	$L_1$	191	$12.97 \pm 0.79$	$22.31 \pm 0.99$
2 <sup>nd</sup> Lactation	$L_2$	125	$12.34 \pm 0.62$	$20.91 \pm 0.78$
3 <sup>rd</sup> Lactation	$L_3$	106	$14.23 \pm 0.67$	$21.59 \pm 0.84$
4 <sup>th</sup> Lactation	$L_4$	104	$12.88 \pm 0.68$	$20.83 \pm 0.85$

*et al.* (1990) reported significant effect of lactation order on days to attain peak yield in Jersey cattle.

#### Heritability estimate:

The estimate of heritability for days to attain peak yield in Jersey cattle was found to be  $0.30 \pm 0.10$ . Higher estimates were reported by Raheja (1982) and Gogoi *et al.* (1993) in J x Haryana and Jersey cattle, respectively. However, lower values were reported by Kumar *et al.* (1992) and Gawari (1999) in Haryana and triple crossbred cattle, respectively.

#### Repeatability estimate:

The repeatability estimate for days to attain peak yield was found to be  $0.19 \pm 0.09$  in present study. Lower estimate of heritability was reported by Gawari (1999) in triple crossbred cattle. Whereas, Agasti *et al.* (1988) and Krishna *et al.* (1991) reported higher values of repeatability in J x Haryana and HF x Deoni cattle, respectively.

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