STUDIES ON AGE AT FIRST CALVING AND FIRST LACTATION PERFORMANCE IN HOLSTEIN FRIESIAN x DEONI STRAIGHT BREDS

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ABSTRACT

The data on Holstein Friesian x Deoni (HF x D) straight breds from Cattle Cross Breeding Project and Agriculture College Dairy over a period of 15 years were considered for present investigation. In all the performance of 135 cows for first lactation were included in the study. The evaluation of age at first calving (AFC), first lactation milk yield (FLMY), first lactation peak yield (FLPY) and first lactation days required to reach peak yield (FLDRPY) was done. The least squares means (LSM) for AFC, FLMY, FLPY and FLDRPY were 1308.75 ± 176.44 days, 1589.35 ± 212.64 kg, 9.14 ± 2.20 kg and 21.59 ± 6.78 days, respectively. The farm effect was significant except for FLMY. The season had non-significant effects on all traits and period had significant effect except for FLDRPY in HF x D straight breds in first lactation.

The high and specialized demand of tomorrows modern dairies emphasise for directing over research efforts more meaningfully in respect of developing our dairy cattle. Involvement of our breeding efforts in manipulating the existing germplasm and its coverage through systematic planning would bring out the desired effects. Milk and draft qualities in cattle are governed by the quantitative inheritance. The age at first calving (AFC) is an important character which directly contribute to the life time performance of a particular cow. Generally the AFC in exotic breeds of cattle is low as compared to indigenous cattle. In the present study performance of AFC, lactation milk yield (FLMY), peak milk yield (FLPY) and days required to reach peak milk yield (FLDRPY) was evaluated and effect of farm, season and period on it was studied in HF x D straight breds in first lactation.

The information on age at first calving (AFC), first lactation milk yield (FLMY), first lactation peak yield (FLPY) and first lactation days required to reach peak yield (FLDRPY) were taken up from individual pedigree sheets and lactation records. The data of 135 HF x D straight breds were included in the study for a period of 15 years (1977-1991). The data accumulated at two farms for above parameters were collected and classified into farm, season and period as follows.

Farm:  
F1 - Cattle Cross Breeding Project (CCBP)  
F2 - Agriculture College Dairy Farm (ACDF)

Season:  
S1 - Cold season (December to February)  
S2 - Hot season (March to May)  
S3 - South-West monsoon season (June to September)  
S4 - Post monsoon season (October to November)

Period:  
P1 - 1977 to 1981  
P2 - 1982 to 1986  
P3 - 1987 to 1991

The effect of farm, season and period were evaluated by the method of Least Squares Technique (Harvey, 1976). Duncan's multiple range test (DMRT) was used to compare the means (Kramer, 1956). The following mathematical model was employed to analyse the data.

\[ Y_{ijkl} = \mu + F_i + S_j + P_k + e_{ijkl} \]

Where,  
\[ Y_{ijkl} \] is the record of cow calved during \( k^{th} \) period in \( j^{th} \) season on \( i^{th} \) farm.
\( \mu \) is the population mean common to all the observations.

\( F_i \) is the effect of \( i \)th farm (1, 2).

\( S_j \) is the effect of \( j \)th season of calving (1,...,4).

\( P_k \) is the effect of \( k \)th period of calving (1,...,3).

\( e_{ijk} \) is the random error assumed to be NID \((0, \sigma^2)\).

Farm effect: The farm effect was significant for AFC (Kaul et al., 1973; Reddy and Basu 1985.), FLPY and FLDRPY. Whereas non-significant for FLMY (Chaudhary and Chaudhary, 1977; Nagarcenkar and Rao, 1982; Rao et al., 1984 and Reddy and Basu, 1985) and FLMY (Bhatnagar et al., 1979; Chaudhary and Chaudhary, 1977; Nagarcenkar and Rao, 1982; Rao et al., 1984 and Reddy and Basu, 1985) and FLPY. The significant difference may be due to variable management and feeding practices of the herds.

Season effect: The season of calving had no significant effect on all the traits (Table 1). This has revealed that Holstein Friesian x Deoni straight bred are efficient to tolerate the seasonal changes. Similar results were reported in cattle by earlier workers for AFC (Koul et al., 1985; Nagarcenkar and Rao, 1982; Patel et al., 1989; Rao et al., 1984 and Reddy and Basu, 1985.) and FLMY (Rao et al., 1984).

Period effect: The period of calving had significant effect on AFC, FLMY and FLPY (Table 1). Similar type of results were reported earlier in the literature for AFC (Basu and Ghai, 1977; Kaul et al., 1973; Koul et al., 1985; Rajan et al., 1981; Rao et al., 1984 and Reddy and Basu, 1985.), FLMY (Bhatnagar et al., 1979; Chaudhary and Chaudhary, 1977; Nagarcenkar and Rao, 1982; Rao et al., 1984 and Reddy and Basu, 1985) and FLPY. The significant differences may be due to variation in management levels over the years. The period of calving had non-significant effect on FLDRPY, which indicated that the management in different periods not influenced the trait.

Table 1. Least Squares analysis of variance for age at first calving, first lactation milk yield, first lactation peak milk yield and first lactation days required to reach peak milk yield

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>AFC</th>
<th>FLMY</th>
<th>FLPY</th>
<th>FLDRPY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm</td>
<td>1</td>
<td>1319149.00*</td>
<td>371228.50</td>
<td>22.64*</td>
<td>859.55*</td>
</tr>
<tr>
<td>Season</td>
<td>3</td>
<td>42002.67</td>
<td>115031.56</td>
<td>7.63*</td>
<td>15.26</td>
</tr>
<tr>
<td>Period</td>
<td>2</td>
<td>8237886.00**</td>
<td>3225430.00*</td>
<td>128.85*</td>
<td>19.80</td>
</tr>
<tr>
<td>Error</td>
<td>128</td>
<td>76422.08</td>
<td>178624.88</td>
<td>4.84</td>
<td>77.22</td>
</tr>
</tbody>
</table>

* Significant at 5 % level  
** Significant at 1 % level

Table 2. Least Squares Means and Standard Error for factors affecting age at first calving, first lactation milk yield, first lactation peak milk yield and first lactation days required to reach peak milk yield

<table>
<thead>
<tr>
<th>Source</th>
<th>Code Sample size</th>
<th>AFC (days)</th>
<th>FLMY (kg)</th>
<th>FLPY (kg)</th>
<th>FLDRPY (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>m</td>
<td>135</td>
<td>1308.75 ± 176.44</td>
<td>1589.35 ± 212.64</td>
<td>9.14 ± 2.20</td>
</tr>
<tr>
<td>Farm</td>
<td>F</td>
<td>84</td>
<td>1318.73 ± 179.14*</td>
<td>1579.30 ± 218.02*</td>
<td>9.10 ± 2.20*</td>
</tr>
<tr>
<td></td>
<td>F_1</td>
<td>51</td>
<td>1199.23 ± 164.04*</td>
<td>1637.41 ± 228.74*</td>
<td>9.57 ± 2.40*</td>
</tr>
<tr>
<td>Season</td>
<td>S</td>
<td>42</td>
<td>1300.70 ± 172.09*</td>
<td>1569.31 ± 216.61*</td>
<td>9.11 ± 2.21*</td>
</tr>
<tr>
<td></td>
<td>S_1</td>
<td>31</td>
<td>1309.63 ± 169.82*</td>
<td>1572.02 ± 210.08*</td>
<td>9.12 ± 2.21*</td>
</tr>
<tr>
<td></td>
<td>S_2</td>
<td>29</td>
<td>1301.72 ± 170.19*</td>
<td>1582.31 ± 211.92*</td>
<td>9.11 ± 2.21*</td>
</tr>
<tr>
<td></td>
<td>S_3</td>
<td>33</td>
<td>1347.16 ± 179.27*</td>
<td>1631.27 ± 227.14*</td>
<td>8.74 ± 2.21b</td>
</tr>
<tr>
<td>Period</td>
<td>P</td>
<td>62</td>
<td>1328.14 ± 172.82*</td>
<td>1584.35 ± 210.23*</td>
<td>9.13 ± 2.20*</td>
</tr>
<tr>
<td></td>
<td>P_1</td>
<td>47</td>
<td>1312.04 ± 174.91*</td>
<td>1570.43 ± 208.41*</td>
<td>9.13 ± 2.21*</td>
</tr>
<tr>
<td></td>
<td>P_2</td>
<td>26</td>
<td>1858.33 ± 178.20b</td>
<td>1400.97 ± 223.51b</td>
<td>10.15 ± 2.22b</td>
</tr>
</tbody>
</table>

Mean superscribed by same letter do not differ significantly from one another.
The overall least squares means of *Holstein Friesian* x Deoni straight breds for AFC, FLMY, FLPY and FLDRPY were 1308.75 ± 176.45 days, 1589.35 ± 212.64 kg, 9.14 ± 2.20 kg and 21.59 ± 6.78 days, respectively (Table 2). Holstein Friesian x Deoni straight breds calved at Agriculture College Dairy farm have better performance for all the traits (Table 2). The post monsoon calvers had higher AFC and FLMY with minimum FLPY and FLDRPY (Table 2). The LSM of cows calved in period for AFC and FLPY was higher whereas for FLMY and FLDRPY was lower (Table 2).

It can be concluded from above findings that AFC and FLPY in straight bred cows (HF x D) is affected due to non-genetic factors i.e. farm and period. The effect arise mainly because of managemental practices. The FLMY in *Holstein Friesian* x Deoni straight breds has substantially increased over that of the pure bred Deoni breed.

REFERENCES


