REPRODUCTIVE EFFICIENCY OF JERSEY COWS UNDER SUBTROPICAL CONDITIONS OF THE PUNJAB

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ABSTRACT

Various parameters of reproductive efficiency of Jersey cows kept at the Livestock Experiment Station, Bhunikey (Pattoki), District Kasur, for the period from 1991 to 2000 were studied. The average values of age at maturity and age at first calving were $615.48 \pm 8.23$ and $926.48 \pm 10.29$ days, respectively and the differences of these parameters during different seasons of birth were statistically non-significant. The average calving to first insemination interval, service period and calving interval were $86.65 \pm 1.71$, $152.66 \pm 4.85$ and $430.15 \pm 4.87$ days, respectively. The differences of calving to first insemination interval among cows calved during different seasons were statistically non-significant. But the differences of calving to first insemination interval during 1st lactation were significant ($P<0.05$) with those of 6th, 7th and 9th lactations. Service period and calving interval in the Jersey cows calved during humid hot season were significantly ($P<0.05$) shorter as compared to those of cows calved during dry hot and spring seasons. Effect of parity on the service period was non-significant, but the effect of parity on the calving interval was significant ($P<0.05$), when the difference of calving interval during 7th and 8th lactation was compared. The average number of services per conception was $2.81 \pm 0.09$. The effect of parity on the number of services per conception was significant ($P<0.05$). The average gestation period was $277.63 \pm 0.21$ days. Higher gestation period was observed in cows carrying male calves than those carrying female calves ($P<0.05$). The frequency of calvings during winter, spring, dry hot, humid hot and autumn seasons was 19.32, 19.20, 9.79, 33.25 and 18.44 percent, respectively.

Key words: Reproductive efficiency, Jersey cows, Pakistan.

INTRODUCTION

The Government of the Punjab imported a herd of 100 Jersey cows from USA during November, 1985, for producing the bulls of high genetic potential to ensure regular and adequate supply of good quality semen for crossbreeding of low yielding non-descript cattle. Various parameters of reproductive performance in imported Jersey cows and their local born progenies have been studied for the period from 1985 to 1991 (Haq et al., 1993).

The present study was designed to evaluate various parameters of reproductive performance in Jersey cows maintained at the Livestock Experiment Station, Bhunikey (Pattoki), District Kasur, for the period from 1991 to 2000. The information thus obtained would enable us to know the adaptability of Jersey breed under local conditions of Pakistan.

MATERIALS AND METHODS

Data concerning reproductive performance of Jersey cows maintained at the Livestock Experiment Station, Bhunikey (Pattoki) District Kasur for the period from 1991 to 2000 were collected. Various parameters of the reproductive efficiency including age at maturity, age at first calving, services per conception, calving to first insemination interval, service period, gestation period, calving interval and frequency of calving were studied. The data on age at maturity and age at first calving were split according to season of birth, while data on calving to first insemination interval, service period and calving interval were grouped according to season of calving. Similarly, the possible effects of parity on number of services per conception, calving to first insemination interval, service period and calving interval were also studied.

To determine the effect of season of birth or calving on various parameters, the months of the year were grouped into following five seasons, as described by Thevamanoharan et al. (2001):

- Winter: December and January
- Spring: February, March and April
- Dry hot summer: May and June
- Humid hot summer: July, August and September
- Autumn: October and November
The arithmetic means with standard error (mean ± SE) for the above mentioned parameters were calculated. In order to see the magnitude of variation in these parameters among different groups, the data were subjected to statistical analysis using analysis of variance technique (Steel and Torrie, 1984) and significant results were subjected to Duncan’s multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

Age at maturity

The average age at maturity in 306 Jersey heifers was 615.48 ± 8.23 days, ranging from 372 to 1434 days. Similar findings were reported by Rafique et al. (2000) and Qureshi et al. (2002) in crossbred heifers in Pakistan. Higher age at maturity (1024.86 ± 27.54 days) was reported in Red Sindhi heifers in Pakistan by Mustafa et al. (2003).

When the data were grouped according to the season of birth, the highest (628.22 ± 12.29 days) and the lowest (586.57 ± 26.43 days) ages at maturity were observed in heifers born during humid hot and dry hot seasons, respectively (Table 1), the difference was non-significant. Similarly, Rafique et al. (2000) reported that the effect of season of birth on age at maturity in crossbred heifers in Pakistan was non-significant. On the other hand, Azam et al. (2001) reported significantly lower age at maturity in winter born Bhagnari heifers than those born in other seasons in Pakistan.

Calving to first insemination interval

The average calving to first insemination interval for 657 records was 86.65 ± 1.71 days, ranging from 46 to 377 days. Rafique et al. (2000a) reported almost similar findings in crossbred cows in Pakistan. When the data were grouped to observe the effect of calving season on subsequent calving to first insemination interval, the longest (89.22 ± 4.24 days) and the shortest (83.71 ± 4.82 days) intervals were observed in cows calved during autumn and dry hot seasons, respectively (Table 1), the difference was non-significant. Similarly,

Table 1: Effect of season of birth and calving on subsequent reproductive traits in Jersey cows (mean ± SE)

<table>
<thead>
<tr>
<th>Seasons</th>
<th>Age at maturity (days)</th>
<th>Age at first calving (days)</th>
<th>Calving to first insemination period (days)</th>
<th>Service period (days)</th>
<th>Calving interval (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td>586.80 ± 20.48 a (51)</td>
<td>896.80 ± 23.84 a (46)</td>
<td>87.87 ± 4.14 a (117)</td>
<td>155.71 ± 13.04 ab</td>
<td>434.57 ± 12.89 ab</td>
</tr>
<tr>
<td>Spring</td>
<td>627.19 ± 21.13 a (70)</td>
<td>905.27 ± 24.27 a (49)</td>
<td>89.20 ± 4.50 a (117)</td>
<td>172.12 ± 11.78 a</td>
<td>449.60 ± 11.80 a</td>
</tr>
<tr>
<td>Dry hot</td>
<td>586.57 ± 26.43 a (23)</td>
<td>907.50 ± 28.30 a (20)</td>
<td>83.71 ± 4.82 a (65)</td>
<td>179.34 ± 13.77 a</td>
<td>456.88 ± 13.75 a</td>
</tr>
<tr>
<td>Humid hot</td>
<td>628.22 ± 12.29 a (92)</td>
<td>955.57 ± 17.94 a (92)</td>
<td>84.02 ± 2.56 a (225)</td>
<td>136.60 ± 7.79 b</td>
<td>412.90 ± 7.89 b</td>
</tr>
<tr>
<td>Autumn</td>
<td>617.43 ± 16.98 a (70)</td>
<td>928.21 ± 22.58 a (62)</td>
<td>89.22 ± 4.24 a (133)</td>
<td>146.83 ± 10.70 ab</td>
<td>425.10 ± 10.69 ab</td>
</tr>
</tbody>
</table>

Values with different superscripts in the same column differ significantly (P<0.05) and values sharing at least one superscript in a column differ non-significantly. Number of available records is given in parenthesis.
the longest (105.73 ± 12.79 days) and the shortest
(69.00 ± 5.39 days) calving to first insemination
intervals were observed in cows during 1st and 9th
lactation, respectively (Table 2). The differences of 1st
lactation with those of 6th, 7th and 9th lactations were
significant (P<0.05). Rafique et al. (2000a) reported
significant effect of parity on calving to first insemi-
nation interval in crossbred cows in Pakistan.

Service per conception
The average number of services per conception for
828 records in Jersey cows was 2.81 ± 0.09, ranging
from 1 to 24. Haq et al. (1993) reported lesser average
number of services per conception (1.83) in Jersey
cows in Pakistan. When the data were grouped to
observe the effect of parity, the highest (3.72 ± 0.47)
and the lowest (1.75 ± 0.08) number of services per
conception were observed during 6th and 1st lactation,
respectively (Table 2). The differences of services per
conception during 6th lactation with those of 1st, 4th,
7th and 9th and the differences of 2nd, 3rd, 5th and 8th
lactations with that of 1st lactation were significant
(P<0.05). Ozbeyaz et al. (1996) reported that number of
services per conception increased with age and parity in
cows.

Service period
For 453 observations, the average service period in
Jersey cows was 152.66 ± 4.85 days, ranging from 46
to 606 days. Murdia and Tripathi (1992) reported
almost similar findings in Jersey cows in India.
However, Javed et al. (2000) reported longer service
period (233.51 ± 7.61 days) in Sahiwal cows in Pakistan.
Similarly, Junjha et al. (1991) and Gogoi et al. (1993)
also reported longer service period (179 and 280 days)
in Jersey cows in India. On the other hand, Haq et al.
(1993) reported shorter service period (101 days)
in Jersey cows in Pakistan.

When the data were grouped according to calving
season, the longest (179.34 ± 13.77 days) and shortest
(136.50 ± 7.79 days) service periods were observed in
cows calved during dry hot and humid hot seasons,
respectively (Table 1). The service period in Jersey
cows calved during humid hot season was significantly
(P<0.05) shorter than that of cows calved during dry
hot and spring season. Similarly, Azam et al. (2001)
reported that Bhagnari cows calving in summer showed
the longest service period and the winter calver cows
showed the shortest service period in Baluchistan
province of Pakistan.

Similarly, when the data were grouped according
to parity, the longest (176.46 ± 33.09 days) and the

<table>
<thead>
<tr>
<th>Lactation No.</th>
<th>Calving to first insemination period (days)</th>
<th>Services per conception (No.)</th>
<th>Service period (days)</th>
<th>Calving Interval (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>105.73 ± 12.79 b</td>
<td>1.75 ± 0.08 a</td>
<td>143.40 ± 12.33 a</td>
<td>425.05 ± 12.89 ab</td>
</tr>
<tr>
<td></td>
<td>(15)</td>
<td>(269)</td>
<td>(20)</td>
<td>(19)</td>
</tr>
<tr>
<td>2</td>
<td>83.80 ± 3.07 ab</td>
<td>3.01 ± 0.17 abcd</td>
<td>160.77 ± 9.23 a</td>
<td>438.07 ± 9.22 ab</td>
</tr>
<tr>
<td></td>
<td>(163)</td>
<td>(208)</td>
<td>(148)</td>
<td>(148)</td>
</tr>
<tr>
<td>3</td>
<td>81.39 ± 3.36 ab</td>
<td>2.96 ± 0.21 abcd</td>
<td>155.78 ± 11.23 a</td>
<td>432.65 ± 11.24 ab</td>
</tr>
<tr>
<td></td>
<td>(109)</td>
<td>(145)</td>
<td>(103)</td>
<td>(104)</td>
</tr>
<tr>
<td>4</td>
<td>82.46 ± 4.36 ab</td>
<td>2.55 ± 0.22 abcde</td>
<td>148.12 ± 10.96 a</td>
<td>425.12 ± 10.91 ab</td>
</tr>
<tr>
<td></td>
<td>(74)</td>
<td>(84)</td>
<td>(65)</td>
<td>(65)</td>
</tr>
<tr>
<td>5</td>
<td>83.16 ± 4.65 ab</td>
<td>2.89 ± 0.43 abcd</td>
<td>140.69 ± 13.21 a</td>
<td>417.90 ± 13.26 ab</td>
</tr>
<tr>
<td></td>
<td>(50)</td>
<td>(63)</td>
<td>(48)</td>
<td>(48)</td>
</tr>
<tr>
<td>6</td>
<td>79.19 ± 7.11 b</td>
<td>3.72 ± 0.47 a</td>
<td>161.48 ± 19.62 a</td>
<td>440.06 ± 19.50 ab</td>
</tr>
<tr>
<td></td>
<td>(36)</td>
<td>(47)</td>
<td>(31)</td>
<td>(31)</td>
</tr>
<tr>
<td>7</td>
<td>79.39 ± 7.81 b</td>
<td>2.41 ± 0.27 c</td>
<td>108.81 ± 13.74 a</td>
<td>386.00 ± 13.91 b</td>
</tr>
<tr>
<td></td>
<td>(18)</td>
<td>(39)</td>
<td>(16)</td>
<td>(16)</td>
</tr>
<tr>
<td>8</td>
<td>92.40 ± 16.95 ab</td>
<td>3.00 ± 0.53 abcd</td>
<td>176.46 ± 33.09 a</td>
<td>454.92 ± 33.07 ab</td>
</tr>
<tr>
<td></td>
<td>(15)</td>
<td>(22)</td>
<td>(13)</td>
<td>(13)</td>
</tr>
<tr>
<td>9</td>
<td>69.00 ± 5.39 b</td>
<td>2.10 ± 0.75 d</td>
<td>113.78 ± 34.75 a</td>
<td>392.11 ± 35.82 ab</td>
</tr>
<tr>
<td></td>
<td>(10)</td>
<td>(10)</td>
<td>(9)</td>
<td>(9)</td>
</tr>
</tbody>
</table>

Values with different superscripts in the same column differ significantly (P<0.05) and values sharing at
least one superscript in a same column differ non-significantly.

Number of available records is given in parenthesis.
shortest (108.81 ± 13.74 days) service periods were observed in cows during 8th and 7th lactation, respectively (Table 2), the difference was statistically non-significant.

**Gestation period**

The average gestation period for 797 records in Jersey cows was 277.63 ± 0.21 days, ranging from 261 to 297 days. Haq et al. (1993) and Mustafa et al. (2003) reported longer gestation period (279.26 ± 0.51 and 283.15 ± 0.64 days) in Jersey and Red Sindhi cows in Pakistan. But Rathi et al. (1992) reported shorter gestation period (276.5 days) in crossbred (Jersey x Sahiwal) cows in India. Significantly (P<0.05) longer gestation period was observed in Jersey cows carrying male calves than cows carrying female calves (279.82 ± 0.34 versus 278.43 ± 0.36 days). These findings are in line with those reported by Haq et al. (1993) in Jersey cows in Pakistan. Longer gestation period in cows carrying male calves may be due to the reason that more time is required to gain higher birth weight in male calves. The frequencies of calving during winter, spring, dry hot, humid hot and autumn seasons in Jersey cows were 19.32, 19.20, 9.79, 33.25 and 18.44%, respectively.

**Calving interval**

For 453 records, the average calving interval in Jersey cows was 430.15 ± 4.87 days, ranging from 319 to 878 days. Deshmukh et al. (1992) and Rafique et al. (2000a) reported almost similar findings in Jersey and crossbred cows in India and Pakistan, respectively. But Gogoi et al. (1993) reported longer calving interval (540 days) in Jersey cows in India. Haq et al. (1993) and Qureshi et al. (2002) reported shorter (381 and 390 days) calving interval in Jersey and crossbred cows in Pakistan.

When the data were grouped according to calving season, the longest (456.88 ± 13.75 days) and the shortest (412.90 ± 7.89 days) calving intervals were observed in Jersey cows calved during dry hot and humid hot seasons, respectively (Table 1). The calving interval in Jersey cows calved during humid hot season was significantly (P<0.05) shorter than that of cows calved during dry hot and spring seasons. Similarly, Haq et al. (1993) and Azam et al. (2001) reported that the cows calving in summer showed longer calving interval than other seasons. However, Jahageerdar et al. (1996) reported non-significant effect of calving season on calving interval in Holstein-Friesian cows.

When the data were grouped according to parity, the longest (454.92 ± 33.07 days) and shortest (386.00 ± 13.91 days) calving intervals were observed in Jersey cows during 8th and 7th lactation, respectively (Table 2). The differences of calving interval during 8th and 7th lactations were found statistically significant (P<0.05). Similarly, Rafique et al. (2000a) reported significant effect of parity on calving interval in crossbred cows.

The variations in different reproductive parameters of this study with those reported by other workers might be due to differences in the breed, management, environment and fertility status of the breeding cows. The normal breeding season of Jersey cows starts just after the humid hot season and maximum conceptions occur during autumn and consequently the service period and calving interval remained significantly (P<0.05) lower for the cows calved during humid hot season.

The present study was conducted for the period from 1991 to 2000 at Livestock Experiment Station, Bhunikey (Pattoki), while Haq et al. (1993) conducted a similar study on the same Jersey herd for the period from 1985 to 1991. It is evident from the results of both the studies that the reproductive performance of Jersey herd at Livestock Experiment Station, Bhunikey is declining gradually. This indicates that managemental practices at the farm need to be improved for better reproductive performance of the herd.

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**REFERENCES**


