DETERMINATION OF PRODUCTIVE AND REPRODUCTIVE TRAITS IN MOUNTAIN CAMEL

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INTRODUCTION
The camel is better milk producer than many Zebu cattle and its milk is comparable with the cow and goat milk. The camels are also slaughtered for meat but at a very small scale in Pakistan. The camel meat is sold in retail market as minced meat. Meat from young camel is comparable to the beef. There is a need to study the production potential of camel in Pakistan (Zia-ur-Rahman et al., 1988) as very little work has been done previously in this aspect. The present work is aimed at studying productive and reproductive traits in mountain camel at Barani LPRI, Kherimurat. This study will help in exploring the economic value of camel in Barani areas and hence the economic status of the producers.

MATERIAL AND METHODS
Performance data of mountain camel were collected (1986-1998) at Barani Livestock Production Research Institute, Kherimurat, Attock. Generally, the animals were maintained in open sheds without shade and shelter for harsh weather. Breeding males, dry and lactating females and sucklers were kept in the same shed. Animals were grazed on fodder and forages grown on the farmland, and naturally available in the range areas of Kherimurat. She camels were only supplemented with necessary concentrate before and during breeding (Nov-Feb). Camels were bred mostly from January to April for spring calving. The bull camels used for breeding were mostly from the farm herd and natural mating was practiced. The camels that failed to breed, had to wait another breeding season with an interval of one year. The camels were moved into maternity sheds about 2 weeks before calving and in group of 2-3 animals. They were under constant surveillance at calving. Immediately after calving, calves were weighed and mother along with their offspring were placed in separate enclosure for easy management. The calves were kept and allowed to suckle their mothers for at least 5 days and special care was provided to calves in critical early days of their lives. Female camels returned to pasture/grazing with their calves within 10-15 days of calving, depending on weather conditions. Camel calves remained with their mothers on grazing pasture from morning to late afternoon and in sheds during nights and until after weaning at one year. For controlling internal and external parasites, dewormer such as Nilzan (ICI) and Negovan/Asuntol (Bayer), were used throughout the period of data collection. Female camels were culled for old age, failure to produce milk or udder infection and for poor body condition. Usually the calves born in the flock do the replacement of culled animal.

Statistical analysis: The performance traits analyzed were 302 days milk yield, dry period, service period, calving interval and gestation period of mountain camels. Milk yields, calving interval and gestation period were analyzed including year and calving number as fixed effects.
in the model. Similar model was used for the analysis of dry period and service period excluding the calving number from the model as fixed effect. Statistical package of Harvey (1987) was used to analyze the traits.

RESULTS AND DISCUSSION

Milk yield. Average milk production in mountain camel was 2408 liters in a lactation period of 302 days and was affected by year (P< 0.05), whereas calving number has non-significant effect on milk yield. Milk yield increased in 1991 as compared to 1990 but decreased thereafter in subsequent years. The erratic changes in milk production during different years are probably due to small sample size. Williamson and Payne (1978) reported that a non-descriptive camel may yield 9kg of milk per day at the peak of her lactation while a day milk yield of 10.42 to 1.0 kg has been reported in Samali and Adal camels (Bpemaud, 1969 ; Knoess, 1977). Yasin and Wahid (1957) reported that Pakistan dromedary could produce 9-14kg of milk when fed well. Jasra and Aujla (1997) reported that dairy milk yield varies from 4-12 liters. Zia-Ur-Rahman et al. (2000) reported low yielding (6±0.8 kg/day) and also high yielding (12.80± 1.8 kg/day) camel in Pakistan. The considerable variation observed in milk production may be due to difference in breed, regional feeding and management conditions and stage of lactation, type of work and milking frequency. However, the estimates indicate that the camel is potentially a better milker than many African and asian Zebu breeds of cattle.

Dry period. Overall dry period in mountain camel average 428.32 days (Table 1) and was significantly affected by year (P>0.05). There was consistent yearly increase in dry period, which could be attributed to changes in breeding and feeding practice at the farm routine.

Age at first calving. The average age at first calving in camel was 1600± 65 days that was less than the result quoted by Hera (1947) and Mares (1954). Average age at first calving of 54.2± 6.3 months were given by Beniwal and Chaudhry (1984) and Wilson (1986). The heritability estimate of age at first calving in Bikaneri camel is very low (Beniwal and Chaudhry, 1984). This indicates that environmental factors have most influence on that trait and through better management a reduction of age at first calving can be achieved. Female reach sexual maturity at three to three and a half years and in certain cases they are allowed to breed from the age of four to five.

Service period. The mean value for service period was 342± 30 days presented in (table 2). The year had a non-significant effect on service period. Maximum and minimum service period was observed in 1993 and 1991 respectively. This could be due to management problem and feed deficiency.

Calving interval. The average calving interval of 705± 40 days was observed. The calving interval was significantly affected by year and calving numbers (P< 0.05). Wajid et al. (1988) and Shah et al. (1988) reported similar findings in dromedaries : camels usually calve once every two years (Yasin and Wahid, 1957). However with improved feeding they may calve every 18 months (Knoess, 1977 and Qureshi, 1986). It is observed that calving interval varied significantly within a heard, and the prolonged calving interval in camel is ascribed to lengthy gestation period, limited breeding season and late post partum estrus, which can be minimized by improving feeding and management conditions.

Gestation length. The results obtained for gestation period in camel averaged 371.89± 5.59 days. The gestation period was significantly affected by year (P< 0.01). These findings came in consistency with some previous studies (Evans and Powys, 1979 ; Hermans et al., 1990;
Arthur, 1992). Where as for Bikaneri camels in India, mean of 389± 28 days (Mehta et al., 1962) 404.3± 4.8 (Ram et al., 1977) and 386.5± 1.8 days (Barhert et al., 1979) were reported. However, shorter gestation period of 345 – 360 days were also reported (Yagil and Etzion, 1980) due to improved management.

**Table 1. Dry period of mountain camel**

<table>
<thead>
<tr>
<th>Year</th>
<th>No</th>
<th>Dry period (mean ±SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>4</td>
<td>230.25 ± 77.86a</td>
</tr>
<tr>
<td>1992</td>
<td>4</td>
<td>588.25 ± 77.86b</td>
</tr>
<tr>
<td>1993</td>
<td>5</td>
<td>476.40 ± 69.64c</td>
</tr>
<tr>
<td>1995</td>
<td>5</td>
<td>418.40 ± 69.64d</td>
</tr>
<tr>
<td>Overall</td>
<td>18</td>
<td>428.32 ± 36.93d</td>
</tr>
</tbody>
</table>

abcd Means with different alphabets are significant from each other at P> 0.05.

**Table 2. Service period of mountain camel at different years**

<table>
<thead>
<tr>
<th>Year</th>
<th>No</th>
<th>Service period (Mean ±SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>3</td>
<td>185.33 ± 88.91</td>
</tr>
<tr>
<td>1992</td>
<td>3</td>
<td>460.66 ± 88.91</td>
</tr>
<tr>
<td>1993</td>
<td>5</td>
<td>511.00 ± 68.87</td>
</tr>
<tr>
<td>1994</td>
<td>3</td>
<td>199.00 ± 88.91</td>
</tr>
<tr>
<td>1995</td>
<td>5</td>
<td>349.40 ± 68.87</td>
</tr>
<tr>
<td>1996</td>
<td>6</td>
<td>355.00 ± 62.87</td>
</tr>
<tr>
<td>1997</td>
<td>4</td>
<td>322.50 ± 77.00</td>
</tr>
<tr>
<td>Overall</td>
<td>29</td>
<td>341.84 ± 29.65</td>
</tr>
</tbody>
</table>

**CONCLUSION**

The average milk production in mountain camel was 2402 liters in a lactation period of 302 days and was affected by year (P<0.05). The calving number had non-significant effect on milk yield. The dry period was 428±36 days and was significantly effected by year (P<0.05). Overall means for service period, calving interval and gestation length was 342±30, 706±40 and 372±5 days respectively. The year significantly effected calving interval and gestation had no effect on service period. The average age at first calving was 1600±65 days.

**REFERENCES**

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