

Comparative Performance of Some Cattle Breeds under Barani Conditions of Pakistan

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ABSTRACT

Productive and reproductive performance records (N = 481) of three breed groups viz., Red Sindhi (milch breed), Dhanni, Dajal, Lohani and Rojhan (draft breeds) and crossbreds (crosses of Red Sindhi and Dhanni with Friesian and Jersey) between 1986 and 1998 were analyzed for this study. Actual lactation milk yield was 1385 ± 46 , 1121 ± 92 and 1792 ± 100 L in three breed groups, respectively. Yield was significantly affected by breed group, season and year of calving. The dry period in the three breed groups averaged 230 ± 15 , 232 ± 30 , and 134 ± 35 days, respectively. The calving interval was highest in Red Sindhi (521 ± 37 days) and lowest in the crossbreds (416 ± 70 days). Wide variation in the potential of different draft breeds suggests that more precise studies are needed to determine the milk production potential of these breeds because future policy for their development and conservation would require whether they be developed as dairy-draft or beef-draft breeds.

Key Words: Performance; Cattle; Breeds; Barani; Pakistan

INTRODUCTION

Pakistan is home tract of some of the finest breeds of *Bos indicus* cattle. These include milch breeds such as Sahiwal, Cholistani and Red Sindhi, the dairy-cum-draft Thari and the draft breeds such as Bhagnari, Dhanni, Dajal, Rojhan and Lohani. They have adapted very well to the hot humid climate of the country and are resistant to the prevalent diseases. They are able to survive and perform multiple function of providing milk, meat and draft power under resource poor feeding and management systems.

Information on most of the cattle breeds with the exception of Sahiwal is scanty. The performance of Red Sindhi cattle under Barani environmental conditions is also not available. For the draft breeds it is often assumed that as their main purpose is to supply bullocks for ploughing and carrying loads etc., productivity for milk and other traits is not relevant. These breeds are being maintained for research purpose at the Barani Livestock Production Research Institute Kherimurat, Attock. The crossbreds of Red Sindhi and Dhanni with Friesian and Jersey were also available at the institute during the study period and were included for comparison.

MATERIALS AND METHODS

Data on productive and reproductive performance of different breeds maintained at Barani Livestock Production Research Institute, Kherimurat, District Attock were collected for the period 1986-98. The breeds included in the

study were grouped as follows: Group-I=Milch (Red Sindhi); Group-II=Draft (Dhanni, Dajal, Lohani and Rojhan); Group-III=Crossbreds (Crosses of Red Sindhi and Dhanni with Friesian and Jersey)

To determine the effect of season on various parameters, the months of the year were grouped in four seasons as spring (February through April), summer (May through July), autumn (August through October) and winter (November through January).

The management practices for different breed group were more or less similar. Generally, the animals were maintained in open sheds with adequate covered space to be used as shade and shelter for harsh summer and winter. The breeding bulls and dry and lactating cows were kept in separate sheds. Cows were grazed on fodder/forage grown on the farmland and also kept on grazing on mountainous range land of Kherimurat farm from morning till evening. Concentrate feeding was practised either for lactating animals or during the feed scarcity period. The bulls used for natural breeding were mostly farm produced. However, artificial insemination was also practiced to some extent especially to produce crossbreds.

Cows were usually moved in to the maternity barns about two months before calving. Calves were allowed to suckle their dams after calving. Most cows were returned to pastures for grazing without their calves within a week after calving, depending on weather conditions. Calves remained in separate pens except at milking time when they were allowed to suckle milk from their dams, until weaning at 90-120 days. Vaccination schedule was similar for all the

breeds. Cows were usually culled for old age, failure to produce milk or udder infections. Replacements were usually selected from calves born in the herd.

Among the performance parameters, lactation milk yield, 305-day milk yield, dry period and calving interval were included in the analysis. Lactation length and service period were excluded because they could be calculated from calving interval and dry period assuming a constant gestation period. The statistical model to analyze these traits included the breed group, parity, season of calving and year of calving except for dry period where breed group and parity were included only due to paucity of observations. The LSMLMW computer program (Harvey, 1991) was used for the analysis.

RESULTS AND DISCUSSION

Milk yield. Average 305 days milk yield and actual lactation milk yield were 1865 ± 77 and 1433 ± 51 L, respectively (Table I) higher 305 days milk yield than the actual milk yield only reflected lactation length lower than 305 days and projection to this resulted in inflated estimates. The effects of year, breed, and season were significant ($P < 0.01$) both the actual and projected yields, while the effect of parity became non-significant for 305 days yield. The highest 305 days and total milk yield was recorded in Group III (crossbreds) while the lowest in the draft breeds (Group II), as expected. Milk yield observed in Group II reported in this study is comparatively higher as compared to the reports available. The actual yield in the three breed groups was 1385 ± 46 (Red Sindhi), 1121 ± 93 (draft breed) and 1792 ± 100 L. Among the draft breeds, the Dajal cows

were better milk producers than the other breeds. Number of cows belonging to various breeds in this group was small i.e. 15 (Dajal), 4 (Lohani), 2 (Rojhan) and 2 (Dhanni) and thus were pooled for the analysis. Yearly variation was also obvious. The 305 days and actual lactation milk yield was maximum in 1993 and minimum in 1998. Maximum milk yield was recorded for the 4th parity (1615 ± 103 L).

Milk production average for Red Sindhi is similar to earlier studies on this breed. Analysis of 1400 records of Red Sindhi cows from the cattle breeding farms Hosur, Madras revealed that the average lactation yield of the foundation stock was 1,384 liters (ICAR, 1957). Basu *et al.* (1979) reported 305-day lactation milk yield of 1450 L. Under Bengladeshi conditions however, first lactation milk yield was reported to be 1174 L (Ghose *et al.*, 1980) as compared to a very high first lactation milk yield average of 1700 L in an Indian study (Taneja & Sikka, 1981). A very recent study on a Red Sindhi herd in Balochistan reported an average lactation milk yield of 1531 ± 35 L in 484 records of Red Sindhi cattle (Mustafa *et al.*, 2002). Milk productivity reports on other draft breeds are not common. Wahid (1975) reported that Dhanni cows under Dhanni cattle breeding scheme produced 770 L of milk with superior group averaging up to 1317 L.

Crossbreds of Red Sindhi with breeds such as Friesian/Jersey have been reported to produce similar or even better than the results of the present study. In the Red Sindhi crossbreds with Friesian, Khan (1986) reported 2064 liters of milk production for first three lactation. Under Indian conditions Red Sindhi x Red Dane crossbreds were reported to produce 3180 L (Madsen, 1976).

Milk yield reported in the present study was quite variable both within and among various breed groups. Performance of crossbreds was similar to many studies of locally adapted breeds with improved breeds such as Friesian/Jersey (Cunningham & Syrstad, 1987; Majid *et al.*, 1996). Crosses of less developed local breeds with improved breeds such as Friesian/Jersey have usually been reported to show increased production in their first cross. On the other hand conservation of locally adapted breeds requires that such temptations should be avoided so that the locally adapted breeds do not vanish. Information on growth potential of locally adapted breeds such as Lohani, Rojhan and Dhanni and Dajal is not available while in case of Dajal and Dhanni, scope of these breeds to be raised for milk-draft breeds also need exploration.

Dry period. The least squares means for dry period were 230 ± 15 , 232 ± 30 and 134 ± 35 for Groups I, II, and III, respectively (Table II). The effect of breed group and parity was significant ($P < 0.05$). The dry period was highest during 1st lactation and lowest in the 9th lactation. Earlier reports on dry period of Red Sindhi are 146 days (ICAR, 1957). Mustafa *et al.* (2002a) reported a very high average of 245 ± 12 days. In Dhanni breed Ishaq (1961) reported that dry period averaged 189 days while in crossbreds of different genetic groups have been reported to range from 90 to 155

Table I. Effect of breed group, season and year of calving on milk yield

| Factor | 305 days Milk Yield | | Actual Lact. Milk Yield | |
|--------------------------|---------------------|---------------------|-------------------------|---------------------|
| | N | Mean \pm SE | N | Mean \pm SE |
| Breed Group | | ** | | ** |
| I | 118 | 1780.4 \pm 68.64 | 189 | 1385.3 \pm 45.72 |
| II | 16 | 1498.3 \pm 158.72 | 34 | 1121.0 \pm 92.70 |
| III | 31 | 2314.9 \pm 130.13 | 38 | 1792.0 \pm 99.85 |
| Season of Calving | | ** | | ** |
| Spring | 48 | 1856.2 \pm 108.38 | 80 | 1440.3 \pm 54.72 |
| Summer | 41 | 1597.8 \pm 109.79 | 70 | 1255.2 \pm 58.22 |
| Autumn | 22 | 1908.8 \pm 146.02 | 32 | 1468.2 \pm 74.66 |
| Winter | 54 | 2095.2 \pm 111.09 | 79 | 1567.4 \pm 55.82 |
| Parity | | NS | | * |
| I | 27 | 1753.2 \pm 134.42 | 54 | 1266.7 \pm 82.10 |
| II | 34 | 1820.0 \pm 115.39 | 52 | 1409.2 \pm 80.41 |
| III | 32 | 1747.0 \pm 124.32 | 40 | 1345.9 \pm 91.69 |
| IV | 21 | 2038.0 \pm 147.05 | 31 | 1614.7 \pm 102.74 |
| V | 14 | 2002.3 \pm 177.88 | 23 | 1576.9 \pm 116.22 |
| VI | 12 | 1913.5 \pm 183.84 | 21 | 1147.1 \pm 118.62 |
| VII | 11 | 1941.4 \pm 190.38 | 14 | 1528.2 \pm 142.51 |
| VIII | 6 | 1711.7 \pm 265.59 | 12 | 1342.4 \pm 159.26 |
| IX | 8 | 1853.6 \pm 235.48 | 14 | 1363.7 \pm 151.22 |
| Overall mean | 165 | 1864.5 \pm 77.11 | 261 | 1432.8 \pm 51.24 |

NS Non-significant; ** Significant ($P < 0.01$)

Table II Effect of breed group and parity on dry period and calving interval

| Factor | Dry Period | | Calving Interval | |
|---------------------|------------|-------------------|------------------|-------------------|
| | N | Mean \pm SE | N | Mean \pm SE |
| Breed Group | | * | | * |
| I | 149 | 230.5 \pm 15.49 | 183 | 521.6 \pm 37.59 |
| II | 28 | 232.3 \pm 30.67 | 254 | 472.7 \pm 37.81 |
| III | 23 | 134.1 \pm 35.90 | 44 | 416.9 \pm 70.20 |
| Parity | | * | | ** |
| I | 39 | 282.6 \pm 27.86 | - | - |
| II | 43 | 212.7 \pm 25.97 | 135 | 584.4 \pm 43.84 |
| III | 30 | 165.1 \pm 30.27 | 107 | 540.2 \pm 47.80 |
| IV | 29 | 197.9 \pm 30.79 | 75 | 505.2 \pm 55.76 |
| V | 19 | 222.0 \pm 37.70 | 54 | 539.2 \pm 65.07 |
| VI | 15 | 187.3 \pm 41.66 | 38 | 460.8 \pm 75.40 |
| VII | 12 | 152.4 \pm 46.68 | 30 | 411.0 \pm 84.12 |
| VIII | 6 | 245.6 \pm 64.81 | 22 | 384.0 \pm 97.06 |
| IX | 7 | 124.6 \pm 60.10 | 20 | 338.1 \pm 48.85 |
| Overall mean | 200 | 198.9 \pm 17.17 | 481 | 470.4 \pm 34.60 |

* Significant (P<.05); ** Significant (P<.01)

days (Zaman *et al.*, 1986). This variation might be due to difference in genotypes and the management practices.

Calving interval. The least squares means for calving interval were 521 \pm 37, 472 \pm 37 and 416 \pm 70 days in Groups I, II and III, respectively (Table II). The effect of breed, lactation number and year of calving was significant. Maximum calving interval was observed in Red Sindhi cattle while minimum in the crossbreds. For parities, maximum value was for the 1st parity (584 \pm 44 days) where after it decreased gradually probably because of selected animals as less productive animals left the herd gradually. Year of calving also showed variation in the trait with maximum average was for 1986 and minimum for 1991. Basu *et al.* (1979) reported a very low first calving interval of 350 days in Red Sindhi cattle. A very high average of 515 \pm 14 days (similar to that of present study) was reported by Mustafa *et al.* (2002a). In Dhanni cattle, average reported by Ishaq (1961) was 417 days. In crossbreds average varied between 422 to 451 days in various studies on *Bos taurus* and *Bos indicus* crossbreds reviewed by Cunningham and Syrstad (1987). In Friesian crossbreds Zaman *et al.* (1986) reported calving interval between 397 and 473 days. In Red Sindhi x Red Dane crossbreds average was 417 days (Madsen, 1976). Thus a very high variation exists in the literature for this trait although, information on Dhanni and other draft breeds is scanty yet, trait is generally determined by the environmental factors and genetic groups can have wide variation.

Information reported on various productive and reproductive traits of draft breeds and Red Sindhi cows is very preliminary as the data available were very limited. Performance of crossbreds was better than the local cattle but there seems some indication of scope for these indigenous cattle to be selected for traits like milk yield. A traditional option for less demanding draft breeds (due to mechanization) is to select or cross them for beef purposes

as happened with many of the draft European breeds when mechanization pushed the economies to go for specialized breeds under high input systems. Breed such a Dajal and Dhanni still show that there is some scope for their selection towards milk instead of beef. As indigenous purebreds need to be conserved as an important national genetic resource (Khan, 2001) precise studies on a large scale are required to further explore the possibilities of these breeds for genetically improving them as a milk-draft or beef-draft breeds. Red Sindhi needs to select however, for milk as it is the send best zebu breed, after Sahiwal, to be raised under resource poor production set ups.

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