REPRODUCTIVE PERFORMANCE OF INDIGENOUS COWS OF AZAD KASHMIR

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ABSTRACT

Data on 197 breeding records of 60 indigenous (Non-descript) cows maintained at Livestock Development Research Centre Raroo, Muzaffarabad, Azad Kashmir, Pakistan from 1989-1998 were analyzed to evaluate their performance with respect to some economically important reproductive traits. The least squares mean for age at first calving in present study was 1632.65±54.52 days with a C.V 13.04%. The analysis of variance revealed a significant (P<0.05) effect of season and year of birth on age at first calving. The least squares mean for post partum oestrus interval was 145.42±98.72 days with a C.V 89.43%. The analysis of variance revealed a non-significant effect of season and year of calving on post partum oestrus interval. The least squares mean for service period was l67.82±95.99 days with a C.V 76.42%. There was a non-significant effect of season of calving on service period but the effect of year of calving was significant (P<0.01). The least squares mean for calving interval in present study was 471.26±89.34 days with a C.V 23.84%. There was a non-significant effect of season of calving on calving interval, whereas the effect of year of calving was significant (P<0.01). Parity had a non-significant effect on post-partum oestrus interval, service period and calving interval in this study.

Key words: Age at first calving, post partum oestrous interval, service period, indigenous cows.

INTRODUCTION

The indigenous cattle make 87 percent of total cattle population of Azad Kashmir (Annon, 1996). These cattle are short structured and live weight ranges from 175 to 225 kg with an average of 200 kg. These animals are dark grey in color with a light grey under belly and a dark face (Tanner, 1978). They have very little feed requirement for their maintenance, are resistant to diseases including ecto-parasites, very well adapted to graze on fragile and mountainous areas of the state, but their production potential is very low. The reproductive performance of indigenous cattle have been extensively studied in Pakistan, (Talbott *et al*., 1997; Dahlin *et al*., 1998; Khan *et al*., 1999., Javed, *et al*., 2000), but all these studies have been carried out mostly in canal irrigated areas of Punjab and no report is available on the performance of indigenous cattle in hilly areas of Pakistan particularly Azad Kashmir. This study is first of its kind in this part of the country.

A detailed and comprehensive analysis of the available data of indigenous (Non-descript) cattle from Livestock Development Research Centre, Raroo, Muzaffarad, Azad Kashmir from 1989 to 1998 was carried out with the objective to evaluate the reproductive traits in indigenous cows viz., age at first calving, post-partum oestrus interval, service period and calving interval and to determine the influence of environmental factors on these traits.

It is envisaged that the information thus generated would help in formulating a breeding plan most suitable to farming community under the local conditions of Muzaffarabad in particular and the whole of Azad Jammu and Kashmir in general.

MATERIALS AND METHODS

A study was carried out on 197 performance records of 60 indigenous (non-descript) cows maintained at Livestock Development Research Centre (LDRC) Raroo, Muzaffarabad, Azad Jammu and Kashmir, from 1989-1998 for the evaluation of reproductive traits like age at first calving, post-partum oestrus interval, service period and calving interval and the effect of environment on these traits.

The data consisted of cow, service sire and calf identities, date of birth, date of service, date of calving, date of drying and date of disposal. Derived variables included age at first calving, post-partum oestrus interval, service period, and calving interval.

In addition to the basic edits of consistency checks for dates and animal identities, records of cows which had aborted, missed a year due to sickness or other reasons were eliminated. Age at calving was computed from birth and calving dates, and all cows with obviously unacceptable ages were eliminated. During the study period cows were either inseminated artificially or natural mating was practised after the heat detection aided by teaser bulls.

Effect of the environmental factors viz year and season of birth / service / calving and parity, as appropriate, on various performance traits was evaluated.

Keeping in view the climatological data the year was divided into five seasons, i.e., winter (December to January), Spring (February to April), Dry hot (May to June) and Humid hot (July to September) and Autumn (October to November).

The mathematical model assumed was-

$Yij = \mu+Fi+eij$

Where

Yij = measurement of a particular trait.

μ = Population mean.

Fi = the effect of all fixed effects with the restriction that $\sum Fi = 0$.

eij = the random error associated with each observation.

For analysis Mixed Model Least Squares Maximum Likelihood (LSMLMW) computer programme (Harvey, 1990) was used.

RESULTS AND DISCUSSION

Age at first calving: Least squares mean for age at first calving in indigenous cows in the present study was 1632.65±54.52 days with a c.v 13.04%. These findings were in accordance with the findings of Chaudhary *et al*. (1995) and Nandagawali *et al*., (1996) who reported that age at first calving in Kankrej and Sahiwal cattle in India was 1623.68 and 1664.1 days, respectively. Higher age at first calving (1787.3 and 1707 days) were reported by Singh and Raut, (1980) and Barwe *et al*., (1996) in non-descript and Gir cows, respectively in India.

Shorter age at first calving (1346 days) was reported by Ahmed, (1998) in Red Sindhi cows, while in Sahiwal cows, age at first calving ranged from 1242 to 1357.80±7.95 days (Mohiuddin, 1987 and Javed *et al*., 2000). Shorter age at first calving (1041.15 days) in Cholistani cows (Chaudhary and Shafiq, 1994) and 1514.23 days in Hariana cows (Duc and Taneja, 1984) was not in line with the findings of present study. In Non-descript (local or Desi) cattle age at first calving as 1244.6 days (Khan, 1999), was not in accordance with the findings of present study.

The age at first calving is an important factor contributing to the milk production in dairy animals. The age at first calving determines the attainment of physical and sexual maturity. Sexual maturity has immense economic importance in dairy animal breeding programs. Economically, early first calving will ensure smaller investment and quicker return of capital. Genetically, it reduces the generation interval resulting in a better annual genetic gain from selection (Javed *et al*., 2000). The age at first calving in indigenous cows in present study is quite high and most of the reports speak of a shorter age at first calving in Bos indicus cows. This difference may be due to variation in breed, the genetic make up, feeding regime, managemental practices, climatic conditions, poor heat detection, and improper time of insemination. Internal worm infestation is likely to affect the age at first calving through its effect on growth rate and hence age at maturity. A reduction in age at first calving can be achieved through better feeding, management, disease control and efficient heat detection and timely service programme. Thus, reducing the age at first calving through improved management holds a wide scope (Javed *et al*., 2000).

The analysis of variance for the evaluation of environmental effects on age at first calving revealed that age at first calving was significantly affected by the year and season of birth. The female calves born during 1991 and 1989 had the maximum age at first calving 1717.96±59.98 and l704.54±211.80 days, respectively, while age at first calving was minimum (1485.27±44.46 days) in cows born during the year 1993. The findings were in accordance with the findings of Khan *et al*., (1999) and Javed *et al*., (2000), who reported a significant effect of year of birth on age at first calving in Sahiwal cows. However, Chaudhary and Shafiq, (1994) studied the factors affecting productive and reproductive traits in Cholistani cows and reported that the effect of year of birth on age at first calving was non-significant.

In the present study, cows born during humid hot season recorded the highest (1840.51±92.68 days) age at first calving whereas it was the shortest (1518.50±105.37 days) for the cows born during winter season. The analysis of variance revealed a significant effect of season of birth on age at first calving. Nandagawali *et al*., (1996) analysed data on two herds of Indian Sahiwals and reported that the effect of season of birth to be significant for age at first calving. However, the findings of present study were not in line with the findings of Javed *et al*., (2000) who reported a non-significant effect of season of birth on age at first calving in Sahiwal cows.

Post Partum Oestrous Interval: Least squares mean for post partum oestrous interval in present study was 145.42±98.72 days with a c.v of 89.43%. The results were in agreement with Chaudhary and Shafiq, (1994) who reported a post-partum oestrus interval of l39.90±8.93 days in Cholistani cows. The findings of the present study were not in agreement with the findings of Islam *et al*., (2002) who reported a post partum oestrus interval of 108.46±36.32 days for indigenous cows in Bangladesh.

Analysis of variance revealed a non-significant effect of year and season of calving on the trait, which was in accordance with the findings of Chaudhary and Shafique, (1994), who reported a non-significant effect of year of calving on post-partum oestrus interval in Cholistani cows. Cows calving during autumn season had the longest (194.56±65.72 days) post partum oestrus interval, whereas it was shortest (82.540±71.56 days) for winter calvers.

The least squares means for post-partum oestrus interval in cows in their different parities is shown in table 1. Analysis of variance revealed a non-significant effect of parity on this trait. The results were in accordance with the findings of Chaudhary and Shafiq, (1994) who reported a non-significant effect of parity on post-partum oestrus interval in Cholistani cows.

Table 1. Least squares means for age at first calving (AFC), Post partum oestrus interval (PPOI), service period (SP) and calving interval (CI) in indigenous cows during different years of birth/calving, seasons of birth/calving and parities.

Traits	AFC (days)	PPOI (days)	SP (days)	CI (days)
Year of birth/calving				
1989	1704.54+ 211.80			
1990	1654.85+74.15			
1991	1717.96+59.98	122.66±31.76	146.26±239.27	475.12±222.68
1992	1600.64+ 83.77	420.98±32.85	456.98±198.71	792.37±184.93
1993	1485.27+44.46	145.96±62.38	167.96±164.88	474.06±153.44
1994	-	72.64±47.59	90.58±132.04	402.46±122.89
1995	-	113.56±64.56	133.69±84.81	430.45± 78.93
1996	-	125.99±33.32	145.99±44.96	436.78± 41.84
1997	-	132.55±76.64	172.64±47.59	430.80± 44.29
1998	-	28.43±76.32	28.43±76.32	328.08± 71.03
Season of birth/calving				
Spring	1573.11±60.29	182.23±24.54	215.94±101.99	500.04±94.92
Hot dry	1598.49±58.54	98.32±35.56	123.35±119.82	456.87±111.51
Dry humid	1840.51±92.68	155.98±37.79	179.61±104.74	485.06±97.48
Autumn	-	194.56±65.72	216.83±98.97	512.73±92.11
Winter	1518.50±105.37	82.540±71.56	103.35±101.99	401.63±94.92
Parity				
I	-	147.21±76.65	172.04±41.76	448.49±38.86
II	-	112.59±77.74	137.06±40.61	438.17±37.80
III	-	108.17±24.89	130.87±85.61	449.45±79.68
IV	-	114.56±29.56	139.06±119.94	456.59±111.62
V	-	117.30±39.22	211.08±179.27	517.37±166.84
VI	-	195.43±47.67	216.78±227.35	517.51±211.58

Post-partum oestrus interval is highly subjected to the influence of management with the major problem of detection of heat. With proper maintenance of records and measures of heat detection (like rectal palpation and use of teaser bulls), this interval can be reduced further, which in turn reduces service period and calving interval therefore enhancing the reproductive efficiency of the cows.

Service Period: The least squares mean for service period in indigenous cows in present study was 167.82+95.99 with a c. v of 76.42%. The results were in agreement with the findings of Ahmad *et al*., (1989) who reported a service period of 145.5 days in Sahiwal cows in Pakistan. Azam (1991) and Reddy and Nagarcenker, (1991) reported a service period of 156.48 and 148 days in Bhagnari and local cows in Pakistan and India respectively. However a much higher service period ranging from 194 to 269 days in different breeds of cattle has been reported by Chowdhary and Barhat, (1980); Talbott *et al*., (1997). Shorter service periods of 113, 114 and 124.53 days were reported by Islam *et al*., (2002) in Red Sindhi, Sahiwal and indigenous cows of Bangladesh, respectively.

Least squares means for service period in indigenous cows calved during different years is shown in table 1. Service period in indigenous cows during the year 1992 was (420.98±32.85), while shortest recorded service period (28.43±76.32) was in 1998 calvers. The significant variation in service period due to year of calving is in line with those reported by Javed *et al*., (2000). However, Arora and Sharma, (1981) reported that service period in Hariana cows was not affected by year of calving.

The analysis of variance revealed a non-significant effect of season of calving on service period. The findings of present study were in agreement with the findings of Gaur and Raheja, (1996), who obtained data on 1186 production and reproduction records of Sahiwal cows and reported that season of calving did not affect the service period.

The effect of parity on service period in the present study was non-significant. These findings were substantiated by the findings of Chaudhry and Shafiq, (1994) who reported a non-significant effect of parity on service period in Cholistani cows.

Calving Interval: The least squares mean for calving interval in indigenous cows in .present study was 471.26±89.34 with a c .v 23.84%. The results were in agreement with many workers (Mohiuddin, 1987; Azam, 1991; Talbott *et al*., 1997; Khan *et al*., 1999; Javed *et al*., 2000) who reported a calving interval in different breeds of cattle ranging from 450 to 480 days. However, Hedge *et al*. (1978); and Khan, (1999) reported shorter calving interval ranging from 411 to 433 days in different breeds of tropical cattle. On the other hand, some workers Chaudhry and Shafiq, 1994; Chaudhary *et al*., 1995; Ahmad, 1998) reported a longer calving interval ranging from 515.3 to 553.29 days in different indigenous breeds of cattle, not in line with the present findings.

Calving interval during different years is depicted in Table 1. The findings of the present study that calving interval is significantly affected by the year of calving were in accordance with the findings of Talbott *et al*., (1997) and Javed *et al*., (2000), who reported a significant effect of year of calving on calving interval. However, Singh *et al*., (1990) analysed data on 108 Sahiwal cows in India and reported that period of calving did not affect calving interval.

Analysis of variance revealed a non-significant effect of season of calving on calving interval. The findings of the present study were in agreement with the findings of (Chaudhary and Shafiq, 1994; Sethi *et al*., 1997). Sethi *et al*., (1997) analysed data on 815 observations of calving interval of Sahiwal cows and found a non-significant effect of calving season on calving interval, however, Talbott *et al*., (1997) and Javed *et al*., (2000) reported a significant effect of season of calving on calving interval in Sahiwal cows.

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