

Research Article

Reproductive performance of Bhagnari cattle breed managed under semi-intensive management condition

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Abstract

The study was conducted on reproductive performance of Bhagnari cattle maintained under semi-intensive management condition at Usta Mohammad Cattle Farm, Baluchistan. The data was collected on eighty four adult Bhagnari cows, selected on the performance record and utilized for this study. The results revealed that the mean age at puberty was recorded as 1154.179 ± 53.48 days and age at first calving was 1462.024 ± 59.38 days. The calving interval was recorded as 437.59 ± 16.91 days, service period 158.71 ± 17.01 days and postpartum estrus period 135.94 ± 11.87 days. The mean milk yield was recorded 785.78 ± 14.53 liters per cow, which was increased from first to 4th lactation. The calving intervals, service period and post-partum estrus was found decreased from 1st to 5th parity. The difference between the parity was non-significant ($P > 0.005$) for calving interval, postpartum period, service period and milk yield. The reproductive performance and milk yield was found very low, which needs to be improved by improving management practices and out-crossing or cross breeding program on scientific line.

Key words: Cattle, Bhagnari breed, Reproductive Performance, Semi-Intensive-management

Introduction

Pakistan is endowed with a large livestock population. The national herd consists of 39.7 million heads of cattle, 34.6 million buffaloes, 29.1 million sheep and 66.6 million goats [1]. Pakistan is the 3rd largest milk producer country in the world [2, 3]. The 60.78% of milk production comes from buffalo; while cattle are producing 35.06% and remaining 4.16% of milk is contributed by sheep, goats and camels [1]. In the past,

cattle were kept for draught purpose. Later, with the industrialization, the cattle occupied the place of dairy and meat animal [4]. In Pakistan, there are more than ten distinct cattle breeds among those Red Sindhi, Sahiwal, Thari, Dhajal and Bhagnari are most popular cattle breeds [5]. The Bhagnari is a beef and draught breed, found in Bhag territory in north of district Jacobabad, Sindh and Sibi district of Baluchistan. Its name probably reflects its origin from Tehsil Bhag

near Sibi, Baluchistan. The Bhagnari cattle have the ability to survive in hard environmental conditions and have resistance power against various diseases as compared to exotic cattle breeds [6]. The reproduction and production are directly influenced by genetic potential of the animals, nutrition, environment, management of farm and staff involved [7]. Under optimal condition a cow heifer should attained puberty at an early age, conceive to fertile mating, produce a viable calf, return to estrus early after calving and again become pregnant and repeat this cycle at regular interval till the end of its productive life [7]. This process insures a harvest of more milk and calf crops during the life time of animal. A delay at any stage causes great economic losses to the livestock farmers [7]. Most of the cows are low producers due to nutritional imbalance, inadequate management practices, lack of timely breeding, poor estrus detection; which causing long calving intervals, increased post-partum period, service period and reduced fertility rate in general and in cattle breed of Baluchistan province in particular [5, 7]. Though some work has been carried out to assess the reproductive performance of Red Sindhi, Sahiwal and other local cattle breeds, but Bhagnari is concerned received very little attention in the past. This study is therefore designed to investigate and collect information on reproductive performance of Bhagnari cattle breed managed under semi-intensive management condition.

Materials and methods

The study was conducted on 84 Bhagnari cows maintained under semi-intensive management conditions at Usta Mohammad Cattle Farm, Baluchistan. The data was obtained from the record available at the farm and utilized for this study. The animals were placed in tail to tail management system. The cows were milked twice a day (morning and evening); hand milking was practiced at the farm. Lactating, advanced pregnant, young

calves, heifers and breeding bulls were categorized and kept in separate sheds. Natural breeding was practiced at the farm. Vaccination and deworming were adopted at the farm as per scheduled. Wheat straw, seasonal green fodders and concentrates (wheat bran, rice bran and cotton seed cake) were given in portions twice a day and common salt blocks were placed in the mangers. The animals were free access to fresh water round the clock. The data were recorded in a separate proforma specially designed for this purpose.

Parameters studied

Age at puberty

Puberty was considered as the time from birth to showing estrus for first time.

Age at first calving

It was computed as the time period between date of birth and first calving.

Calving interval Intervals between two successful calving.

Service period: The interval from parturition to fruitful mating.

Postpartum estrus

Interval from parturition to appearance of estrus for first time after calving.

Milk yield

Whole lacteal secretion free from colostrum obtained by complete milking.

Statistical analysis

The data were Analyzed Statistically using Standard Statistical method T-test, Variance and Standard Deviation.

Results and discussion

Age at puberty

Puberty is the process of acquired development of reproductive competency. The mean age at puberty was recorded as 1154.179 ± 53.48 days in Bhagnari cows (Table-1). The results recorded in present study for age of puberty are in accordance to the results reported (720 to 1024 days) in Red Sindhi and Bhagnari cattle breed [8, 9]. The findings of current study fall within the range (1350 day) reported for indigenous and

crossbred cattle [10, 11]. The results recorded in present study for age at puberty were shorter (540 to 987 days) than the results reported by various authors in Holstein Friesian and Jersey cattle [12, 13]. The age at puberty of local Pakistani cattle breeds was higher than the European cattle breeds [14, 15]. The delayed age at puberty observed in

present study may be due to the genetic factors, climate, malnutrition and poor managerial practices at the farm. The age at puberty can be reduced by crossing the local breed animals with the exotic breeds or out crossbreeding with selected animals.

Table 1. Age at puberty, age at first calving and calving intervals in Bhagnari cattle

Variable/Parameters	No of observation	Mean(\pm SEM) days	Range (days)
Age at puberty	84	1154.179 \pm 53.48	542-1667
Age at first calving	84	1462.024 \pm 59.38	818-1945
Calving intervals	294	437.59 \pm 16.91	333-863

Age at first calving

The life time production depends upon the age at first calving. Shorter the age at first calving causing increase in life time production both in calf crop and milk production. In the present study the mean age at first calving was recorded as 1462.024 \pm 59.38 days in Bhagnari cows (Table-1). The results of present study falls in the range to those reported from 763-2150 days in indigenous cows [10], 420 to 1620 in crossbreed cows [11] and 524 -1827 days in Bhagnari cattle [9]. The results of current study falls in the close range with little variation between 1235 to 1345 days in Sahiwal cattle [16] and 1120 to 1345 days in Red Sindhi cattle [8, 17]. The results of current study are higher than the figures (701 to 987 days) reported in Holstein Friesian cattle [13]. The age at first calving was reduced up to 963 to 1020 days, when Holstein Friesian cows crossed with Zebu and Sahiwal cows [14, 15]. In the present study the age at first calving was found higher, which was possibly due to genetic factor, low nutrition plan, poor management and environmental condition.

Calving interval

One calf per year is considered to be highly profitable primary achievement in cattle farming. Shorter the calving interval, higher would be the chance of profitable farming

business. The mean calving interval was recorded as 437.59 \pm 16.91 days. It was slightly decreased from 1st to 5th calving in Bhagnari cattle. The results were significantly difference ($p>0.05$) among the various parity for calving interval in Bhagnari cattle (Table-1 &2). The results obtained in present study are in close agreements to those reported from 429 to 515 days in Red Sindhi cattle [7, 17] and 397 to 473 days in Sahiwal cattle breed and crosses of Holstein Friesian cattle [13, 16]. However a shorter calving interval (388 to 450 days) was reported in Holstein Friesian cows as compared to the finding of present study [12,13] and similar trend was also reported (414 days) in Holstein Friesian cross with Sahiwal cows, when maintained at Okara Punjab Pakistan [16] and slightly shorter (379 to 444 days) calving interval was reported for Simmental and Sanga cows [19, 20]. In contrast to this a longer calving interval of 540 days was reported in Red Sindhi and Holstein Friesian cattle [14, 16] and 612 in indigenous cattle breeds [10]. A Long calving interval found in present study could be due to the hot summer, heat stress and reduced feed intake due to hot weather that causing increase in water losses and mineral imbalance that may cause depressed and weak estrus signs and ovarian activity in Bhagnari cattle.

Table 2. Mean (\pm SEM) calving interval from 1st to 5th calving in Bhagnari cattle

Parity	No. of cows observed	Calving Interval (days) Mean (\pm SEM)	Range (days)
Calving-1	84	520.12 \pm 12.676a	335-663
Calving -2	82	465.66 \pm 12.830 b	345-625
Calving -3	64	442.95 \pm 14.522 b	336-602
Calving -4	46	380.93 \pm 17.130 c	336-557
Calving-5	18	370.89 \pm 27.383 c	333-467
Total average	294	437.59 \pm 16.91	333-663

Service period

The mean service period was recorded as 158.71 \pm 17.014 days, which was ranged from 56 to 487 days and it was decreased from 1st to 5th parity. Analysis of variance showed a significant difference ($p > 0.05$) between the parity for the service periods in Bhagnari cattle (Table-3). The results recorded for services period in present study were in close agreements with the results reported as 155 days in Sahiwal cattle [16] and 156.48 days in Bhagnari cattle [9]. The similar trend was reported as 151 days in Jersey [12], 153 days in Sanga [21] and 167.26 \pm 9599 days in indigenous cows of Azad Kashmir [10].

Table 3. Mean (\pm SEM) service period in Bhagnari cattle

Parity	No. of cows observed	Service period (days) Mean (\pm SEM)	Range (days)
Service-1	84	191.06 \pm 12.637a	56-487
Service -2	82	164.02 \pm 12.790 b	70-447
Service -3	64	144.78 \pm 14.477 b	60-418
Service -4	46	137.54 \pm 17.076 b	90-368
Service -5	18	154.18 \pm 28.090 c	60-189
Total average	294	158.71 \pm 17.014	56-487

Postpartum estrus period

The post-partum estrus period start from calving and lasts until uterine involution is completed and the female animal has resumes regular estrus cycle. Normally it ranges from 42-90 days, but some of the cow may ovulate around the day 21th after calving, without showing any signs of estrus. Behavioral signs of estrus cannot be established before 42 days of calving [14]. The mean postpartum estrus period was

However, shorter service period was reported, which was ranged between 94 and 124 days in Simmental cows [19], whereas similar trend (135 and 139 days) was reported in the cross breed and Red Sindhi cows [7, 17]. In contrast to this a longer service period was reported as 222.22 days in Holstein Friesian cows [13] and 235.87 \pm 14.05 days in Red Sindhi cattle [7, 8]. The longer service period may be due to that, because of these animal were kept for dairy purpose and owners were interested only in receiving milk production, their lack of interest in rebreeding caused the longer service period.

recorded as 135.269 \pm 10.876 days and it was found to be decreased from 1st to 5th parity. A significant ($p < 0.05$) results was found between the parity 2nd to 4th for postpartum estrus period in Bhagnari cows (Table-4). The results recorded in the current study were in close agreements to the results reported as 145.42 \pm 98.72 days in indigenous cows in Kashmir Pakistan [10]. The results for postpartum estrus period of Bhagnari cows was found in present study was higher than

the figures (24-76 days) reported in Zebu cattle and (88 days) in Sanga cows [14, 19], whereas with little variation (90 to 105 days) in Red Sindhi cattle [7, 17]. A slightly higher results than the finding of present study were reported as 177.1 ± 12.5 days for postpartum estrus period in cross breed cattle [21].

Table 4. Mean (\pm SEM) postpartum estrus period in Bhagnari cattle

Parity	No. of cows observed	Post-partum estrus(days) Mean (\pm SEM)	Range (days)
Postpartum-1	84	$150.50 \pm 8.884a$	56-207
Postpartum-2	82	$138.72 \pm 8.992 b$	49-192
Postpartum-3	64	$124.94 \pm 10.178 b$	60-174
Postpartum-4	46	$135.58 \pm 12.138 b$	42-126
Postpartum-5	18	$132.44 \pm 19.192 b$	64-164
Total average	294	135.269 ± 10.876	42-1172

Milk yield

Milk and milk byproducts are the single largest commodity which supply much needed quality proteins, minerals and vitamins to the human family. The average milk yield was recorded as 785.78 ± 14.53 liters. The analysis of variance showed a significant ($p > 0.05$) difference between the lactations in Bhagnari cows (Table-5). The results reported in Red Sindhi cattle and in Sahiwal cattle [7, 17, 22] were higher than the findings of current study. The milk yield reported in some indigenous beef and draught cattle breeds i.e. Thari (1140) and Colistani (1235) were also higher than the figures observed in current study [10, 14]. However

Similar trend (152 days) was reported in Sanga cattle [20]. However in present study, the postpartum estrus period was observed delayed as compared to some other breeds this may reflect the poor nutrition and poor management at the farm, breed and genetic factor of the breed.

higher milk yield than the present study was reported in Holstein Friesian cows by many scientists [13, 14, 18]. Improvement in the milk yield was recorded up to 1385 to 2064 liters, when Red Sindhi cows crossed with Holstein Friesian cows [7, 18]. The findings of the present study were lower than the findings of other scientists because of the Bhagnari cattle is a beef and draught breed not dairy animal same has been proved in the current study, because of low milk production. On the other hand low milk yield recorded in current study, indicates the breed genetic factors, poor nutrition and poor management at the farm.

Table 5. Mean (\pm SEM) milk yield per lactation in Bhagnari cattle

Lactation	No. of lactation observed	Milk yield(liters) Mean (\pm SEM)	Range (liter)
Lactation-1	84	$534.7 \pm 10.846 d$	363-977
Lactation-2	82	$784.4 \pm 11.045 c$	516-991
Lactation-3	64	$1040.2 \pm 12.523a$	779-1297
Lactation-4	46	$923.5 \pm 14.818 b$	715-1159
Lactation-5	18	$729.3 \pm 23.429 c$	543-910
Total average	294	785.78 ± 14.53	363-1297

Conclusion

It is concluded that the Bhagnari breed is low milk producer, attained late age at puberty,

late age at first calving and having long calving interval and postpartum estrus period. It was observed that the Bhagnari

breed could be reared for meat purpose and not suitable for dairy. It is suggested on the basis of the study that the reproductive herd health management program should be implemented at the farm. Out-crossing or cross breeding program should be introduced at the farm to reduce age at puberty, age at calving, calving intervals and increase in milk production of the animals of this breed.

Authors' contribution

Conceived and designed the experiments: HK Kunbhar, Performed the experiments: SM Sharif & AA Memon, Analyzed the data: H Abro & V Suthar, Contributed reagents/materials/ analysis tools: GA Mughal, Wrote the paper: HK Kunbhar & R Abro.

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