



Productive and reproductive performance of Siri cattle under field condition in West Bengal

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ABSTRACT

A study was undertaken with an objective to assess productive and reproductive performance of Siri cattle in West Bengal. The study was conducted among 80 farmers rearing either Siri-Pure or Siri-Graded cattle in the hilly region. Equal numbers of respondents either rearing Siri-Pure or Siri-Graded cattle were randomly selected from Darjeeling and Kalimpong districts for the study. The study on productive performance of Siri-Pure and Siri-Graded cattle shows that mean first lactation milk yield was 469.7 and 497.2 litres, daily milk yield was 3.2 and 3.7 litres, peak milk yield was 3.8 and 4.2 litres, total lactation milk yield was 864.1 and 1035.5 litres, lactation length was 273.4 and 284.8 days and dry period was 189.3 and 167.9 days. The t-test shows highly significant difference between Siri-Pure and Siri-Graded cattle in first lactation milk yield, daily milk yield, total lactation milk yield and lactation length in productive performance whereas age at first services, calving intervals and gestation period in reproductive performance. The reproductive performance of Siri-Pure and Siri-Graded cattle shows that mean age at first services was 38.47 and 31.65 months, gestation period was 285.2 and 279.1 days, heat interval was 27.8 and 28.2 days, number of services per conception was 1.3 and 1.3 times, and calving intervals recorded as 463.7 and 452.7 days respectively. The age at first service was significantly lower in large farmers and significantly higher calving interval in small farmers rearing Siri-Pure cattle. Daily milk yield, peak milk yield and total milk yield was significantly higher in large and medium farmers than small farmer rearing Siri-Pure cattle whereas total milk yield was significantly higher in large farmers than small and medium farmers rearing Siri-Graded cattle.

Keywords: Darjeeling, Productive, Reproductive, Siri cattle

Siri cattle play a key role in subsistence farming system as a source of milk and milk products, draft power and manure which are mainly reared by farmers who live in remote areas under extreme poverty and food insecurity. Siri cattle breed is widely distributed in the various parts of Sikkim and hill districts of West Bengal and also in Bhutan. According to the estimated livestock population based on breed survey there was only 17,749 Siri where 12,171 was Siri-Pure and 5,578 was Siri-Graded. Further among the total population, 11,254 was from Sikkim and 5,479 was from West Bengal (GoI, 2013). Siri cattle are recognized as low milk producing dairy cattle.

Rare or endangered breeds are often highly adapted and their performance should be measured comparatively within their own environmental conditions. Furthermore, they should be examined with respect to the products for which they were selected and valued in the conditions under which they evolved. Population of Siri cattle breed has also been declining over the last few years due to intensive crossbreeding with Jersey and Holstein semen through artificial insemination. Therefore an attempt was undertaken

to assess productive and reproductive performance of Siri cattle in the hill tract of West Bengal.

MATERIALS AND METHODS

The study was purposively conducted between April, 2017 to February, 2018 to assess productive and reproductive performance of Siri cattle in its home tract of West Bengal. Siri is the only indigenous descriptive cattle breed in West Bengal and Sikkim. Siri cattle being developed through natural selection have high adaptation to wide range of hilly terrain (altitudes 150–2,500 m) in Himalaya with wide variation of temperature (17°C to 30°C in summer, 5°C to 20°C in winter) and rainfall of 3894 mm during May to September (Bera *et al.* 2016).

Data was collected through questionnaire applied on productive and reproductive performance parameters, i.e. first lactation milk yield, daily milk yield, peak milk yield, total lactation milk yield, lactation length, dry periods, age at first service, heat interval, service per conception, calving interval and gestation period were collected from 80 farmers covering 146 Siri-Pure or Siri-Graded cattle in the region. The data were collected from 64 Siri-Pure and 82 Siri-Graded cattle from equal number of farmers. This was estimated from a population at various stages of lactation,

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lactation number, age and locations covering different agro-ecological zones, therefore should fairly represent the performance parameters of Siri cattle in the home tract of this breed. Respondents were also categorized according to the herd size of the respondents. Farmers rearing only one dairy cattle were categorized as small farmer, two dairy cattle as medium farmer and 3 or more was categorized as large farmers. The collected data was tabulated and analyzed with suitable statistical tools using SPSS 20 software.

RESULTS AND DISCUSSION

Productive performance: Table 1 presents the productive performance parameters of Siri-Pure and Siri-Graded cattle in West Bengal. The mean first lactation milk yield of Siri-Pure was 469.7 litres, daily milk yield was 3.2 litres, peak milk yield was 3.8 litres, total lactation milk yield was 864.1 litres, lactation length was 273.4 days and dry period was 189.3 days whereas mean first lactation milk yield of Siri-Graded was 497.2 litres, daily milk yield was 3.7 litres, peak milk yield was 4.2 litres, total lactation milk yield was 1035.5 litres, lactation length was 284.8 days and dry period was 167.9 days. The comparative study shows that Siri-Graded has higher first lactation milk yield, daily milk yield, peak milk yield, total lactation milk yield, lactation

length and lower dry period. The t-test analysis reveals that there was highly significant difference between Siri-Pure and Siri-Graded cattle in respect to first lactation milk yield, daily milk yield, total lactation milk yield and lactation length. Previous studies on Siri cattle have been reported that average milk yield per day was 2 to 6.5 kg (Pundir *et al.* 2016), 2 to 6 kg (Nivsarkar *et al.* 2000) and 3 to 4 kg (Tantia *et al.* 1996). The mean lactation record was 309 days for the local cattle in Bhutan (Wangdi *et al.* 2016), 280 days for the local cattle in Haryana (Manjusha *et al.* 2016) and 295 days for dairy cattle in commercial farms in Karnataka (Sathisha *et al.* 2018).

Table 2 shows mean productive performance of Siri-Pure and Siri-Graded cattle according to the type of farmers. The study shows that daily milk yield, peak milk production and total lactation milk yield of Siri-Pure cattle had significantly higher production when reared by medium and large farmers than small farmers. Dry period of Siri-Pure cattle reared by large farmers was significantly lower than small and medium farmers and similarly dry period of Siri-Pure cattle was significantly lower in medium farmers than small farmers.

The total lactation milk yield and dry period in Siri-Graded cattle reared by large farmers was significantly higher and lower respectively than small and medium farmers rearing Siri-Graded cattle.

Reproductive performance: Table 3 presents the reproductive performance parameters of Siri-Pure and Siri-Graded cattle in West Bengal. The mean age at first services of Siri-Pure cattle was on 38.5 months, heat interval at 27.8 days, number of services per conception was 1.3 times, calving intervals at 463.7 days and gestation period as 285.2 days where as the mean age at first services of Siri-Graded cattle was on 31.7 months, heat interval as 28.2 days, number of services per conception was 1.3 times, calving interval at 452.7 days and gestation period as 279.1 days. The comparative study shows that Siri-Graded cattle has lower age at first service, lower gestation period, higher heat interval, lower number of services per conception and lower calving interval than Siri-Pure cattle. The t-test analysis reveals that there was highly significant difference between Siri-Pure and Siri-Graded cattle in respect to age at first services, gestation period and calving interval. Alam and Gosh (1994) reported that the productive and reproductive performance of indigenous crossbred cows

Table 1. Productive performance of Siri-Pure and Siri-Graded cattle (Mean±SE)

Parameter	Siri-Pure (n=64)	Siri-Graded (n=82)	Siri-Total (N=146)
First lactation milk yield (litres)	469.69±5.58 ^a	497.20±6.99 ^a	485.14±4.75
Daily milk yield (litres)	3.21±0.08 ^a	3.65±0.05 ^a	3.46±0.05
Peak milk yield (litres)	3.84±0.09	4.23±0.09	4.06±0.07
Total lactation milk yield (litres)	864.06±15.96 ^a	1035.49±11.21 ^a	960.34±11.74
Lactation length (days)	273.42±4.10 ^a	284.76±2.10 ^a	279.79±2.32
Dry period (days)	189.31±5.51	167.94±3.97	177.31±3.96

Note: Superscript with same alphabet differ significantly.

Table 2. Productive performance of Siri-Pure and Siri-Graded cattle according to the type of farmers (Mean ± SE)

Parameter	Siri-Pure			Siri-Graded		
	Small (n=22)	Medium (n=24)	Large (n=18)	Small (n=14)	Medium (n=22)	Large (n=46)
First lactation milk yield (litres)	443.21±4.32	486.67±5.18	497.50±5.03	461.61±5.05	512.00±5.28	528.57±6.15
Daily milk yield (litres)	2.75±0.12 ^{ab}	3.42±0.05 ^a	3.46±0.09 ^b	3.45±0.02	3.73±0.10	3.82±0.03
Peak milk yield (litres)	3.37±0.07 ^{ab}	3.85±0.08 ^a	4.47±0.12 ^b	3.32±0.12	4.34±0.10	4.79±0.06
Total lactation milk yield (litres)	765.48±16.17 ^{ab}	921.30±14.94 ^a	1038.00±15.26 ^b	930.40±10.76 ^a	1045.91±11.38 ^b	1106.77±12.16 ^{ab}
Lactation length (days)	272.62±4.01	273.58±4.59	274.31±3.78	280.52±2.02	283.50±2.46	288.87±2.56
Dry period (days)	194.81±5.11 ^{ac}	188.54±5.90 ^{ab}	178.13±5.49 ^{bc}	172.11±5.01 ^a	168.72±4.04 ^b	159.78±3.78 ^{ab}

Note: Superscript with same alphabet differ significantly.

Table 3. Reproductive performance of Siri-Pure and Siri-Graded cattle (Mean±SE)

Parameter	Siri-Pure (n=64)	Siri-Graded (n=82)	Siri-Total (N=146)
Age at first service (months)	38.47±0.70 ^a	31.65±0.44 ^a	34.16±0.48
Heat interval (days)	27.84±0.44	28.15±0.41	28.01±0.31
Service per conception (no.)	1.30±0.06	1.29±0.05	1.30±0.03
Calving interval (days)	463.67±3.40 ^a	452.71±2.79 ^a	457.51±2.20
Gestation period (days)	285.19±0.51 ^a	279.11±0.16 ^a	281.77±0.35

Note: Superscript with same alphabet differ significantly.

Table 4. Reproductive performance of Siri-Pure and Siri-Graded cattle according to the type of farmers (Mean ± SE)

Parameter	Siri-Pure (n=64)			Siri-Graded (n=82)		
	Small (n=22)	Medium (n=24)	Large (n=18)	Small (n=14)	Medium (n=22)	Large (n=46)
Age at first service (months)	42.25±0.77 ^a	36.29±0.68 ^b	33.50±0.59 ^{ab}	32.58±0.38	30.79±0.48	31.33±0.40
Heat interval (days)	28.46±0.47	28.00±0.45	26.08±0.39	27.97±0.40	28.43±0.38	28.04±0.42
Service per conception (no.)	1.35±0.06	1.33±0.06	1.42±0.05	1.27±0.06	1.39±0.05	1.24±0.05
Calving interval (days)	479.42±3.79 ^{ab}	458.71±3.10 ^a	461.58±3.38 ^b	450.00±2.56	458.14±2.89	449.71±2.76
Gestation period (days)	284.57±0.72	286.31±0.26	285.08±0.40	279.51±0.10	278.61±0.18	279.14±0.21

Note: Superscript with same alphabet differ significantly.

with high yielding exotic may differ among different geographical areas. Bera *et al.* (2016) reported that average age at first calving and average calving interval were 51.5 months and 474.7 days respectively, further they reported that average lactation length was 239.00±2.04 days. The average daily milk yield and peak milk yield per day were 2.13±0.05 kg and 3.08±0.05 kg, respectively. The overall mean gestation period, services per conception and calving interval for the dairy breeds and their crossbred in Bhutan were 279 days, 21.0 days, 1.33 nos. and 488 days respectively (Wangdi *et al.* 2016). Sathisha *et al.* (2018) reported that average age at first calving, average service period, average service per conception and calving interval of dairy animals of the respondents were 2.74±0.47 years, 119.59±13.45 days, 2.62±0.58 months and 17.02±1.74 months respectively.

Table 4 shows the reproductive performance of Siri-Pure and Siri-Graded cattle according to the herd size of the respondents. The study shows that the age at first service in Siri-Pure cattle reared by large farmers was significantly lower than small and medium farmers rearing Siri-Pure cattle. The study also shows calving interval in Siri-Pure cattle reared by small farmers was significantly higher than medium and large farmers rearing Siri-Pure cattle. Other parameters like heat interval and service per conception and gestation period didn't show any significant difference among different categories of farmers rearing Siri-Pure cattle. There was no significant difference in reproductive performance of Siri-Graded cattle among different types of farmers.

Productive and reproductive performance of the Siri-Graded cattle in the region shows better performance in terms of production performance than Siri-Pure cattle which might be due to the higher artificial insemination facilities and good quality bulls of exotic breed like Jersey and Holstein in the villages. Further, large farmers rearing Siri cattle show better reproduction and higher productive

performances. Higher productive and reproductive performances of Siri cattle might be due to better artificial insemination facilities and higher knowledge and adoption of the farmers engaged in Siri cattle rearing in this region.

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