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# Performance evaluation of Badri cattle

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ABSTRACT

The present study was carried out to assess the performance of the recently certified Badri cattle, which is adapted to the topography and climate of Uttarakhand. Performance of the cattle was measured using various traits, viz. milk yield/day (litres), lactation length (months), dry period (days), productive life (years), age at puberty (years), age at first calving (years), breeding capacity (number of calves born/cow), inter calving period (months), conception rate (number of services/conception), service period (months) and draught animal power. The study was conducted in 12 villages from 4 blocks of Almora and Pauri Garhwal district of Uttarakhand by personally interviewing 120 Badri cattle owners through semi structured interview schedule. There is no significant difference between the 2 districts with respect to various performance traits. The average milk yield/day/cow, lactation length, dry period and productive life were found to be 1.6±0.7 litre/day, 11.8±2.1 months, 1.9±0.7 months and 11.9±1.6 years, respectively. The average age at puberty, age at first calving, breeding capacity, inter calving period, conception rate and service period were observed to be 3.2±0.7 years, 4.3±0.7 years, 8.8±1.4 calves/cow in lifetime, 13.7±1.9 months, 1.4±0.6 service/conception and 4.7±1.9 months respectively. Average working days/year, average working hours/day and average area ploughed/day were 32.9±7.6 days/year, 3.9±0.9 h/day, 0.4±0.05 acres/day respectively. Keeping in view the lower performance of the Badri cattle there is need of improvement by starting various plan and strategies to spread the importance of nutrition and better management practices by the government, which will further encourage the people of hills to conserve the cattle along with increasing the viability and profitability of Badri cattle rearing among the marginal and landless farmers.

**Key words**: Badri cattle, Draught power, Performance, Production, Reproduction, Uttarakhand

Uttarakhand exhibits a high fluctuation in temperature, i.e. from –5.4°C in Mukteshwar to 40°C in Pantnagar. Such topography and climatic conditions of Uttarakhand is difficult for the survival of crossbred and exotic cattle, but the indigenous cattle of Uttarakhand which has recently been named as Badri cattle is highly adapted to this climate. Badri cattle of Uttarakhand has been registered as 40$^{th}$ cattle breed of the country and become the first ever certified breed of Uttarakhand. The Badri cattle is a small size breed having small straight legs, varied body colors (black, brown, red, white or grey); prominent hump; and small size udder, which is tucked up with the body. Estimated population of the breed is 1.6 million and is showing a decreasing population growth.The Badri cattle is mainly reared among the marginal farmers of rural Uttarakhand and is rarely found in urban region. For improving upon various aspects of the cattle production, it becomes a necessity to evaluate various production, reproduction and draught power performance of the Badri cattle.

## MATERIALS AND METHODS

Among all the districts, 2 highly cattle populated districts from the Garhwal and Kumaun commissionay, i.e. Pauri Garhwal and Almora, were selected for the study. The population of indigenous cattle has its highest proportion present in Pauri Garhwal (17.8%) followed by Almora (11.5%) district. From each district, 2 blocks were selected for the study and from each block 3 villages were selected for the study making a total of 12 villages. Selection of blocks and villages was done randomly. Ten respondents from each village having 2 Badri cattle with a minimum of 2 years of experience were selected randomly. The data on production, reproduction and draught performance parameters of Badri cattle were collected from respondents using semi structured interview schedule by direct questioning and were based on their perception and recall basis.

The performance parameters of Badri cattle including milk yield/day/cow (litre), lactation length (months), dry period (months), productive life (years), age at puberty (years), age at first calving (years), no. of calves born/cow in its lifetime, inter calving period (months),conception rate (no. of artificial insemination/successful conception), service period (months) and draught animal power were evaluated.

## RESULTS AND DISCUSSION

*Production performance:* Average milk yield/day/cow of Badri cattle ranged between 0.5–3 litre with average yield of 1.6±0.7 litre/day (Table 1). Among Badri cattle owners

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majority (41.7%) of respondents revealed that average milk yield of cattle is between 1.3–2.2 litre/day followed by 0.5–1.3 litre/day by 37.5% of respondents and 2.2–3.0 litre/day by 20.8% of respondents. The two districts showed no significant difference with respect to milk yield/day of Badri cattle. These observations were close with the findings of Pundir *et al.* (2013) who reported that milk yield of Uttara cattle is between 0.5–3 kg with an average of 1.1 kg. Balaraju (2016) reported that average milk yield of indigenous cattle is 1.9 litre with majority (43.8%) of respondents having cattle with milk production between 0.5–1.7 litre/day. Average daily milk yield for different breeds was 2.07±0.13 litre for Hallikar (Singh *et al*. 2008a) and 2.11±0.17 litre for Malnad Gidda (Singh *et al.* 2008b). The low milk production of Badri cattle can be improved primarily by improving the nutrition availability to the animal and secondarily by other measures like selective breeding, using a good pedigree bull for mating, preserving the semen of elite bull as well as conducting research on special requirement of the Badri cattle.

Average lactation length of Badri cattle was observed as 11.8±2.1 months with majority of respondents (32.5%) expressing their indigenous cattle has lactation length of 10–12 months followed by 8–10 months (31.7%), 12–14 months (25.0%) and even 14–16 months (10.8%). These observations were in concurrence with the findings of Pundir *et al.* (2013) who reported that lactation length of Uttara cattle is between 8–18 months with an average 275 days (9.16 months). Balaraju (2016) in Karnataka reported that majority (51.2%) of respondents expressed that their indigenous cattle had short lactation length (6–8 months). Lactation length in different breeds of indigenous cattle ranged between 5–8 months in Hallikar cattle (Singh *et al.* 2008a) and 9–15 months in Malnad Gidda cattle (Singh *et al.* 2008b) and Pulikulam cattle (Singh *et al.* 2012). Dry period of Badri cattle ranged between 0.5–4 months with an average of 1.9±0.7 months. Majority of the respondents (49.2%) revealed that the dry period of Badri cattle is between 1.7–2.8 months followed by 0.5–1.7 months (29.2%) and 2.8–4 months (21.7%). Balaraju (2016) reported that majority (49.2%) of respondents reported dry period of 3.7–4.7 months with an average of 3.9 months in Karnataka. Dry period of Badri cattle was very low in the present study. This can also be one of the reasons for low milk production of the cattle as a longer dry period allows the dam to prepare better for next lactation and also increases the production.

Majority of respondents (44.2%) revealed that Badri cattle has productive life between 10.3–12.7 years followed by 12.7–15 years (37.5%) and 8–10.3 years (18.3%). Productive life of Badri cattle ranged between 8–15 years with an average of 11.9±1.6 years in the study area. There is no significant difference between the two districts with respect to productive life of Badri cattle. These observations were in concurrence with the findings of Pundir *et al.* (2013) who found that herd life of Uttara cattle is between 12–15 years. Balaraju (2016) reported that productive life span of indigenous cattle is between 11–14 years with an average of 12.3 year in Karnataka. Productive life span of Pulikulam cattle in Tamil Nadu was found to be 20 years as reported by Singh *et al.* (2012) and Kebede *et al.* (2015).

Badri cattle owned by 52.5% respondents showed estrus between 2–3 years of age followed by >3–4 years (45.5%) and >4–5 years (2.5%) of age. Age at puberty varied from 2 to 5 years with an average of 3.2±0.7 years. These observations were close to the findings of Kumar and Gaur (2016) who conducted a study on hill cattle of Pithoragarh district in Uttarakhand and found that average age at first estrus is 3.5 years. Balaraju (2016) reported that indigenous cattle owned by majority of respondents showed first estrus between 2–3 years in Karnataka. Various other researchers have reported age at puberty in other breeds, viz. 41±0.2 months in Kathani breed (Kulkarni *et al.* 2013), 20 to 21 months in Tharparkar (Bhagat *et al.* 2012) and 18 months and above in Hallikar (Singh *et al.* 2008a). Badri cattle owned by 50.8% of respondents had their first calving at 3–4 years of age followed by between >4–5 years (45.5%) and >5–6 years (4.2%) of age. Age at first calving varied from 3–6 years with an average of 4.3±0.7 years. There is no significant difference between the two districts with respect to age at first calving of Badri cattle. These observations were in concurrence with the findings of Pundir *et al.* (2013) who found that age at first calving in Uttara cattle is between 3 to 5 years with an average of 46 months. Kumar and Gaur (2016) reported that age at first calving of hill cattle of Uttarakhand on an average is 52.7 months. Balaraju (2016) reported that indigenous cattle had age at first calving between 36 – 48 months in Karnataka for majority (45.80%) of respondents. Age at first calving in various other indigenous breeds have been reported as 53.5±0.2 months in Kathani cattle (Kulkarni *et al.* 2013), 44–61 months in Dangi (Phule and Maske 2012), 47.6 months in Khillari (Phule and Maske 2012), 36.24±0.8 months in Hallikar (Singh *et al.* 2008a) and 45.41±1.2 months in Malanad Gidda cattle (Singh *et al.* 2008b).

*Reproductive performance:* Majority of respondents (48.3%) revealed that the breeding capacity of Badri cattle ranged between 6–8 calves followed by >8–10 calves (38.3%) and 4–6 calves (13.3%). The average breeding capacity of Badri cattle in the study area was 8.8±1.4 calves (Table 1). There is no significant difference between the two districts with respect to breeding capacity of Badri cattle. The results were in concurrence with the report of Pundir *et al.* (2013) who observed the breeding capacity of Badri cattle to be 8–10 offsprings/cow in it is lifetime in Uttarakhand hills. Balaraju (2016) reported that breeding capacity of indigenous cattle is between 4–10 calvings in lifetime with overall mean of 6 calvings/cow Karnataka. The time gap between two successive calving in Badri cattle ranged between 11–18 months with an average of 13.7±1.7 months. Results revealed that the inter-calving period is between 11–13.3 months for majority of respondents (45.0%) followed by 13.3–15.7 months (36.7%) and 15.7–18 months (18.3%). The results obtained are closer to the

reports of Pundir *et al.* (2013) who reported that the average calving interval of Uttara cattle is 456 days (15.2 months). Balaraju (2016) in Karnataka reported that intercalving period of indigenous cattle is between 11–18 months with an average of 13.9 months. Various researchers reported calving interval in different breeds as 12 – 36 months for Hallikar cattle (Singh *et al.* 2008a), 17.02±0.68 months in Malnad Gidda (Singh *et al*. 2008b) and 12 to 17 months in Bachur (Chandran *et al*. 2014).

Majority of the respondents (75.9%) revealed that the number of services/conception was one while 12.9% respondent reported 2 service/conception and 11.1% reported 3 service/conception with an average of 1.4±0.6 service/conception. Kumar and Gaur (2016) reported that the average conception rate of hill cattle of Pithoragarh district in Uttarakhand was 1.8±0.1. As per Balaraju (2016) in Karnataka reported that majority of respondents revealed that their indigenous cattle get conceived in 1–2 services/ conception with an average conception rate of 1.98. Chandran *et al.* (2014) reported that Bachur cattle generally conceived in one service. Hallikar cows got conceived within 1–3 services with mean of 1.4±0.1 services as reported by Singh *et al.* (2008a). According to Singh *et al.* (2008b) number of service/conception in Malnad Gidda cattle was 1.5±0.07. Majority of Badri cattle owners (45.0%) revealed that the service period of the cattle ranged between 2–4.3 months followed by 4.3–6.7 months (36.7%) and 6.7–9 months (18.3%) with an average of 4.7±1.9 months. The longer service period recorded for Badri cattle may be seen due to the reason that some time animal does not show estrus due to poor nutrition or some time even if animal comes in heat, the farmer ignored it as they had misconception that if animal is taken to service it will dry off rapidly. The results obtained are close to the study of Pundir *et al.* (2013) who reported that the service period of Uttara cattle is between 3–6 months with an average of 124 days (4.1 months). Balaraju (2016) in Karnataka reported that their indigenous cattle has service period between 2–6 months with an average of 3.4 months.

*Draught power:* The average working days/year, average working hours/day and average acres of area ploughed/day for Badri bullock were 32.9±7.6 days/year, 3.9±0.9 h/day and 0.4±0.05 acres/day respectively (Table 1). The results obtained are similar to the study of Pundir *et al.* (2013) that bullock of Hill cattle were used for 20–45 days in a year with an average of 0.5 acre of land ploughed/day. Kumar and Gaur (2016) reported that the average duration of work was 4.52 h/day. Balaraju (2016) reported that average working of indigenous breed in Karnataka was 6.7 h/day with average area ploughed was 0.79 acre/day. The difference obtained in results may be due to the fact that although Badri cattle has better draught potential but the agricultural practices by marginal farmers of Uttarakhand is slowly decreasing because of migration due to unemployment and less education facilities, decreased rainfall, lack of availability of water for irrigation and wild animals.

Table 1. Average production, reproduction and draught power performance of Badri cattle

| Parameter | Almora | Pauri Garhwal | Pooled |
|---|---|---|---|
| *Production performance* | | | |
| Milk yield/day/cow (litre) | 1.7±0.7 | 1.6±0.7 | 1.6±0.7 |
| Lactation length (months) | 12.5±2.1 | 11.1±1.9 | 11.8±2.1 |
| Dry period (months) | 1.7±0.7 | 2.1±0.7 | 1.9±0.7 |
| Productive life (years) | 12.3±1.6 | 11.4±1.5 | 11.9±1.6 |
| *Reproduction performance* | | | |
| Age at puberty (years) | 3.2±0.7 | 3.2±0.6 | 3.2±0.7 |
| Age at first calving (years) | 4.3±0.7 | 4.2±0.6 | 4.3±0.7 |
| Breeding capacity (no. of calves born/cow) | 8.8±1.4 | 8.7±1.3 | 8.8±1.4 |
| Inter calving period (months) | 14.2±2.0 | 13.2±1.8 | 13.7±1.9 |
| Conception rate (no of services/conception) | 1.7±0.8 | 1.3±0.5 | 1.4±0.6 |
| Service period (months) | 5.2±2.0 | 4.2±1.8 | 4.7±1.9 |
| *Draught power* | | | |
| Working days/year | 33.06±7.6 | 32.50±8.2 | 32.9±7.6 |
| Working hours/day (h) | 3.89±1.0 | 3.80±0.6 | 3.8±0.9 |
| Area ploughed/day (acres/day) | 0.4±0.05 | 0.35±0.05 | 0.4±0.05 |

Keeping in view the low performance of Badri cattle there is need of improvement in performance by starting various plan and strategies to spread the importance of nutrition and better management practices among respondents, which will help in increasing the performance of the cattle. Milk yield of cattle can be improved by identifying the specific requirements for Badri cattle which should be investigated upon apart from practicing selective breeding. The agricultural practices should be improved in the hilly areas which will promote the use of Badri bullock. This will further encourage the people of hills to conserve the cattle with increasing the viability and profitability of marginal and landless farmers rearing Badri cattle.

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