Indian Journal of Animal Sciences **84** (8): 872–875, August 2014/Article
https://doi.org/10.56093/ijans.v84i8.43271

Characteristics and performance of Bachaur cattle in the Gangetic plains of North Bihar

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Received: 29 January 2014; Accepted: 18 April 2014

ABSTRACT

A field study was undertaken in 53 villages belonging to 5 blocks of Sitamarhi district of Bihar to study the morphometric and performance traits of Bachaur cattle in its breeding tract. Animals (752) of both sexes belonging to different age groups were studied. The study revealed that in Bachaur cattle, a small size breed, the height at withers, body length and chest girth were 119.23±0.47 cm, 116.99±0.48 cm and 150.88±0.55 cm in adult males and 112.53±0.25 cm, 109.71±0.25 cm and 140.46±0.32 cm in adult females, respectively. The estimated body weights of Bachaur cattle were 246.76±2.42 kg in adult males and 200.55±1.32 kg in adult females. Among the draught breeds of India, the Bachaur cows were reasonably good milkers with an average lactation yield of 752.10±5.82 kg and peak yield of 4.70±0.07 kg/ day. The breed is reported to be regular in reproduction cycle with the age at first calving and calving interval of 31.55±0.35 months and 14.44±0.22 months, respectively in its breeding tract. Bachaur cattle fulfilled the livelihood requirement of cattle farmers in the breeding tract by its draught power to a greater extent and by milk and dung to a smaller extent. The strategies for improving the performance of the cattle are discussed.

Key words: Bachaur, Cattle, Morphometric characteristics, Live weight, Milk

Bachauor cattle, one of the recognized indigenous breeds of cattle in India, is distributed in the Gangetic plains of North Bihar. The economy of Bihar completely depends on agriculture and allied sectors. Here, the Bachaur cattle plays a crucial role in converting agriculture byproducts into efficient draught power and propelling the livelihood status of livestock farmers slowly into comfort zone. The breed evaluation studies in the breeding tract under field conditions may help the breeders to make further plans to take up breed improvement programmes to increase the efficiency of the breed. However, only little studies have been taken up in Bachaur cattle to find its status and performance of the breed under field conditions. Hence, the present investigation was undertaken to study the characteristics of the Bachaur cattle and to record the production and reproduction performance of breed in its breeding tract.

MATERIALS AND METHODS

Origin of the breed: The breed acquired its name, 'Bachaur' from its breeding tract which falls under erstwhile Bachaur parganas of Bihar. Though the land in the breeding tract is very fertile, it is very often prone for submergence due to flooding. As far as soil is concerned, it was reported to have medium level of nutrients (Ministry of Agriculture 2012).

Housing management: The economy in the breeding tract of Bachaur cattle is almost agrarian; 96% of farmers rearing Bachaur cattle were either landless or possessing little land. Irrespective of the economic conditions of the farmers, all the Bachaur cattle were provided with proper housing as this breed acts as buffer stock in fulfilling the partial or complete requirements livelihood needs of the farmers. Bachaur cattle were mostly kept on outside under the shades during daytime and kept inside the sheds in the night. The sheds were mostly *kachcha* type with walls made up of bricks and mud and the roof was either thatched or made with paddy straw. The climatic conditions in the breeding tract forced the farmers to provide at least the minimum requirement of housing as the minimum temperature during winter in the area reaches to the level of 7 to 8° C.

Breeding management: Breeding was generally carried out by artificial insemination with the semen of exotic germplasm paving the way for genetic dilution and subsequent endangering of the breed. The farmers who understand the importance of the breed and intend to preserve it use the Bachaur bulls for crossing their cows.

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The bulls for breeding were not owned by any particular farmer or breeder as they were let roaming freely in the field in the breeding tract. Wherever need arises for breeding, these bulls were used. The bulls used for breeding were not selected for any particular trait.

Feeding management: The Bachaur cattle were completely stall-fed by 88% farmers in the breeding tract and the rest of farmers allowed their cattle for grazing apart from stall-feeding. The average duration of grazing was 4.7 h and the grazing distance ranged from 0.5 to 3 km. The cattle were provided with an average of 6.7 kg of dry fodder, mainly of *bhusa*, 12.3 kg of green fodder, mainly of sudan grass in summer, *berseem* and cauliflower leaves in winter. These animals were also given concentrate mixture of broken rice, wheat, maize and wheat bran which ranged from 0 kg to 3 kg. The quantity of concentrate depends on the sex and physical activity of the cattle.

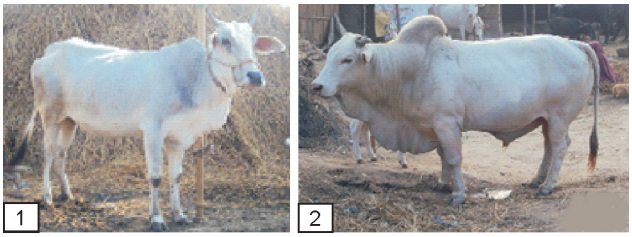
The study was undertaken in 53 randomly selected villages in 5 blocks of Sitamarhi districts of Bihar namely Sursand, Dumra, Pupri, Riga and Belsand. The morphological characteristics of the breed were studied as per the guidelines given by Breed Descriptors for Cattle (FAO 1986). Different management practices adopted by the farmers for Bachaur cattle were studied by observation and through questionnaire during the study. The morphometric traits of Bachaur cattle at different ages were recorded as per the standard procedure and the reproduction traits were ascertained with the help of questionnaire.

Statistical analyses: The data were subjected to statistical analyses as per Snedecor and Cochran (1989) and the results obtained were presented as mean and standard error. The body weights of the breed at different ages were estimated with the help of Shaeffer's formula, with certain modifications to convert the weight in pound to weight in kilogram, as given below:

$$\text{Body weight (kg)} = \frac{(\text{Chest girth in inches})^2 \times (\text{Body length in inches})}{300} \times 0.4536$$

RESULTS AND DISCUSSION

Morphological characteristics: The breed is small size in its stature. The coat colour of the breed was generally white with splashes of grey hair on the forehead and neck region (Figs 1–2). However, 14% of cattle surveyed in the breeding tract possessed varying degrees of brown coat colour also. The forehead was medium in size and the nasal bridge was slightly concave. The ears were generally erected horizontally. Both males and females were horned. The horns were small, black and oriented 45° to 60° laterally giving almost a typical 'V' shaped structure with flat bottom. The eyes were generally small with black eyelashes. The survey also revealed that 7% animals possessed white eyelashes. Black muzzle was found in 84% and pink muzzle in 16% Bachaur cattle. The neck was short and legs were thin. The hooves and tail were black. The hump was large in bulls, medium in bullocks and small in cows. The udder in the cows is small and the milk vein is not prominent.



Figs 1–2. **1.** Bachaur cow **2.** Bachaur bull.

The calves were generally white with brownish coat colour. The colour of coat remains the same till 3 months of age and changes towards pure white after 3 months.

Morphometric characteristics: The different morphometric characteristics of Bachaur cattle studied under field conditions at various ages are given in Table 1. Height at withers and body length of Bachaur cattle were almost similar to each other whereas the chest girth was higher than these morphometric measurements at all ages. Faster growth in Bachaur cattle was noticed till 5½ years of age and the rate of growth declined after this period. The cows recorded lesser value of morphometric traits than their male counterparts at all ages. The mean values of morphometric traits observed in the adult Bachaur cattle are comparable to the findings of Singh *et al.* (2010). The breed had comparatively lesser morphometric values than the one reported by Singh *et al.* (2008a) in Hallikar and Gokhale *et al.* (2009) in Khillar cattle. However, mean morphometric values of Bachaur cattle at different ages as found in the present study were higher than that reported by Dhal *et al*. (2007) in Khariar, Singh *et al*. (2008b) in Malnad Gidda and Chandran *et al.*(2012) in Red Purnia cattle. The variations in these traits among different Indian breeds might be due to different genotypes, environmental factors and the interactions between genotype and environment.

Body weight: The body weights of Bachaur cattle at various ages estimated based on Shaeffer's formula are given in Table 1. The adult body weight ranged from 173.83 kg to 308.65 kg with an average of 246.76±2.42 kg in Bachaur bullocks and 167.20 kg to 253.48 kg with an average of 200.55±1.32 kg in Bachaur cows. Dhal *et al.* (2007) in Khariar and Samantray *et al.* (2009) in Ghumusar cattle reported the mean body weights of 105.40±0.22 kg and 198.22±1.32 kg in adult males and 90.85±0.24 kg and 145.50±1.15 kg in adult females, respectively, which were lesser than the adult body weights of Bachaur cattle found in our study. However, Bachaur cattle weighed lesser than Khillar (Gokhale *et al.* 2009) cattle at different ages. The body weights at different ages indicated that Bachaur cattle is one of the small sized cattle breeds of India. Incidentally, most of the species of livestock and their breeds distributed in the Eastern region of the country are either smaller or medium in size and Bachaur is not an exception too.

Performance traits: The mean performance of Bachaur cattle with respect to milk production and reproduction traits are shown in Table 2. The mean lactation yield of Bachaur

Table 1. Mean ± SE along with CV% for morphometry (cm) and body weight (kg) of Bachaur cattle

Traits	Calves (< 1 year)	Growing stocks (1–3 years)	Adults (bullocks / cows)			Adults (ages pooled)
			3–5½ years	5½-7 years	> 7 years	
Height at withers (cm)						
Males	89.84±0.96	103.35±0.69	113.69±0.54	121.65±0.51	124.28±0.72	119.23±0.47
	(25) [5.33]	(43) [4.38]	(67) [3.87]	(72) [3.54]	(39) [3.63]	(178) [5.21]
Females	77.45±0.65	93.14±0.48	109.47±0.24	114.72±0.39	115.69±0.54	112.53±0.25
	(44) [5.53]	(98) [5.07]	(164) [2.80]	(133) [3.89]	(67) [3.80]	(364) [4.24]
Body length (cm)						
Males	86.84±0.96	100.53±0.79	111.66±0.62	119.72±0.54	121.13±0.82	116.99±0.48
	(25) [5.51]	(43) [5.12]	(67) [4.57]	(72) [3.85]	(39) [4.25]	(178) [5.51]
Females	70.48±0.70	89.23±0.50	107.45±0.27	110.90±0.43	112.87±0.63	109.71±0.25
	(44) [6.59]	(98) [5.53]	(164) [3.16]	(133) [4.49]	(67) [4.54]	(364) [4.43]
Chest girth (cm)						
Males	95.72±0.87	128.53±0.67	143.78±0.57	153.58±0.50	158.10±0.70	150.88±0.55
	(25) [4.57]	(43) [3.42]	(67) [3.26]	(72) [2.74]	(39) [2.75]	(178) [4.82]
Females	80.41±0.65	115.18±0.38	135.45±0.27	143.84±0.40	146.03±0.56	140.46±0.32
	(44) [5.39]	(98) [3.27]	(164) [2.51]	(133) [3.17]	(67) [3.13]	(364) [4.38]
Face length (cm)						
Males	38.24±0.59	45.28±0.40	48.61±0.31	51.64±0.28	52.38±0.41	50.66±0.22
	(25) [7.71]	(43) [5.77]	(67) [5.16]	(72) [4.68]	(39) [4.91]	(178) [5.84]
Females	27.02±0.56	40.18±0.26	46.40±0.19	48.24±0.25	48.61±0.31	47.48±0.15
	(44) [13.72]	(98) [6.42]	(164) [5.28]	(133) [5.86]	(67) [5.16]	(364) [5.85]
Face width (cm)						
Males	14.28±0.44	16.51±0.34	18.64±0.24	19.63±0.26	19.36±0.35	19.20±0.16
	(25) [15.46]	(43) [13.44]	(67) [10.63]	(72) [11.07]	(39) [11.21]	(178) [11.13]
Females	12.00±0.31	15.13±0.21	16.45±0.16	17.32±0.21	17.54±0.21	16.97±0.11
	(44) [16.95]	(98) [13.44]	(164) [12.58]	(133) [13.88]	(67) [9.84]	(364) [12.90]
Ear length (cm)						
Males	18.08±0.45	21.47±0.40	23.58±0.21	24.61±0.22	25.28±0.27	24.37±0.14
	(25) [12.36]	(43) [12.09]	(67) [7.28]	(72) [7.64]	(39) [6.73]	(178) [7.76]
Females	14.00±0.28	17.13±0.20	19.49±0.18	20.35±0.22	20.49±0.26	19.99±0.13
	(44) [13.16]	(98) [11.36]	(164) [11.85]	(133) [12.28]	(67) [10.35]	(364) [11.93]
Tail length (cm)						
Males	59.36±0.94	67.51±0.75	74.76±0.59	79.61±0.45	80.08±0.81	77.89±0.38
	(25) [7.96]	(43) [7.31]	(67) [6.47]	(72) [4.75]	(39)[6.32]	(178) [6.54]
Females	45.00±0.32	59.30±0.25	69.45±0.31	75.79±0.42	76.07±0.62	72.98±0.29
	(44) [4.72]	(98) [4.13]	(164) [5.74]	(133) [6.37]	(67) [6.65]	(364) [7.57]
Horn length (cm)						
Males	1.00±0.24	1.37±0.23	4.56±0.24	9.81±0.22	21.18±0.32	10.32±0.49
	(25) [122.47]	(43) [107.89]	(67) [43.88]	(72) [19.41]	(39) [9.44]	(178) [63.11]
Females	0.59±0.13	1.33±0.15	3.62±0.19	7.32±0.22	11.57±0.38	6.43±0.21
	(44) [142.84]	(98) [111.33]	(164) [66.81]	(133) [34.41]	(67) [26.89]	(364) [61.02]
Horn circumference (cm)						
Males	1.76±0.41	2.79±0.42	11.75±0.20	13.92±0.19	18.15±0.25	14.03±0.22
	(25) [117.45]	(43) [97.84]	(67) [14.09]	(72) [11.86]	(39) [8.62]	(178) [20.62]
Females	1.02±0.20	3.28±0.34	9.69±0.37	11.40±0.18	12.55±0.32	10.84±0.20
	(44) [127.38]	(98) [102.04]	(164) [48.79]	(133) [18.70]	(67) [20.95]	(364) [34.76]
Body weight (kg)						
Males	73.50±1.54	153.32±2.01	212.94±1.94	260.56±2.06	279.39±3.14	246.76±2.42
	(25) [10.51]	(43) [8.61]	(67) [7.46]	(72) [6.72]	(39) [7.02]	(178) [13.10]
Females	42.14±0.80	109.32±1.01	182.13±1.15	212.35±1.95	222.19±2.21	200.55±1.32
	(44) [12.62]	(98) [9.10]	(164) [8.08]	(133) [10.57]	(67) [8.13]	(364) [12.52]

Figures in round and square parentheses are number of observations and coefficient of variations (CV), respectively.

Table 2. Performance of Bachaur cattle in the breeding tract

Traits	Mean	Range
Lactation yield (kg)	752.10±5.82	540–850
Peak yield (kg)	4.70±0.07	3–6
Lactation length (days)	258.79±2.26	220–280
Age at sexual maturity (months)	21.44±0.36	17–26
Age at first calving (months)	31.55±0.35	26–37
Calving interval (months)	14.44±0.22	12–17
Services per conception	1.23±0.06	1–3

cows was 752.10±5.82 kg with an average peak yield of 4.70 kg/ day depending on the resources available with the farmers. The range of lactation length of Bachaur cows varied from 220 days to 280 days in the breeding tract with a mean of 258.79±2.26 days. Considering the small stature of Bachaur cattle, the milk production potential of Bachaur cannot be rated inferior though Bachaur is considered as one of the draught purpose cattle breeds of India. Lactation length observed in this study is in close agreement with the reports of Pundir and Singh (2008), who reported 230 to 270 days of lactation length in Red Kandhari cattle. Singh *et al.* (2008a) in Malnad Gidda reported the lactation yield and peak yield of 569.13±46.24 litre and 3.09±0.24 litre, respectively, which were lesser than the findings of our study. In Bachaur cattle, higher milk production might be due to larger body size when compared to Malnad Gidda cattle as body weight and milk yield are positively correlated traits. Availability of green fodder and agricultural byproducts throughout the year might also be the reasons for better milk yield from Bachaur cows.

The farmers rearing Bachaur cattle did not experience any reproductive problem as the age at first calving was 31.55±0.35 months and calving interval 14.44±0.22 months. The Bachaur cows rarely needed more than one service for getting conceived. Dhal *et al.* (2007) reported longer age at first calving of 1,540.99±4.29 days and calving interval of 510.97±2.64 days in Khariar cattle, whereas Pundir and Singh (2008) reported closer value of calving interval (450 days) in Red Kandhari cattle. The soil in the breeding tract is very fertile with plenty of water available throughout the year makes the green fodder available to Bachaur cows throughout the year. This might be one of the reasons for the regular reproductive cycle of Bachaur cattle under field conditions.

Utility of the breed: Though Bachaur cows fulfilled the household requirement of milk to the cattle farmers in the breeding tract, the main purpose of keeping these cattle was for its draught power. Most of the farmers in the breeding tract fully depend on Bachaur cattle for their farm operations as the trained bullocks could continuously be used for 6 to 8 h in a day for ploughing purpose. However, the work duration in this study is lesser than the report of Singh *et al*. (2008a) who reported 8.18 h/day in Hallikar cattle. Smaller size of Bachaur than Hallikar cattle might be one of the reasons for the lesser work duration of Bachaur cattle. Besides farm operations, Bachaur cattle were also used as a marketing commodity because they fetch high prices in the local markets. The dung from these cattle was widely used for fuel purpose after drying it.

Bachaur cattle, a small sized breed with an average lactation yield of 752.10±5.82 kg and peak yield of 4.70±0.07 kg per day, fulfilled the livelihood requirement of cattle farmers in the breeding tract by its draught power to a greater extent and by milk and dung to a smaller extent.

ACKNOWLEDGEMENT

The authors are thankful to the Director, ICAR Research Complex for Eastern Region, Patna for complete assistance provided during the study.

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