Physical features and management of migratory Nari cattle population of Rajasthan

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ABSTRACT

The Nari cattle are maintained as migratory herds in Pali and Sirohi districts of Rajasthan. In this study phenotypic characterization of the Nari cattle was carried out through systematic survey in its breeding tract and the breed descriptors were developed for its registration as a distinct breed. The population of Nari cattle in the breeding tract is expected to be more than 50,000. Nari cattle have compact body and are strong and active. The cows are generally white or grey in coat colour; the bulls are white, dark grey or black in colour. Biometry of 354 animals, which included nine different body measurements in different age and sex groups, was recorded. When compared with Kankrej breed of cattle, the body measurements viz. body length, height at withers, chest girth and paunch girth of Nari cattle are lower. The average horn length of Nari cattle was 51.68 cm, which is more than Kankrej and other indigenous cattle breeds. The circumference of horn at base is larger in Kankrej cattle than in Nari. This indicated that Nari cattle may be having the longest horn compared with all the indigenous cattle breeds of India. The animals are kept in big herds with size varying from 20-100 animals under pastoral production system as well as under extensive production system as stationary herds. The average age at first calving was 3.5 to 4.5 years with a calving interval of 1.25 to 2 years. On an average the bulls start mating at the age of 3.0 to 3.5 years and used for breeding up to around 10 years of the age. The life span of the animals was around 20 years with life time number of calvings of 8-10. It was observed that the peak milk yield of Nari cows ranged from 3 to 8 kg. Animals of this breed are playing a significant role in the rural livelihood of Raika community in terms of milk and bullocks power for agricultural operations. This cattle population has not been included in the list of recognized cattle breeds of India. The unique physical features, biometry and their production system makes Nari cattle population as having distinct identity, therefore, may be registered as a new cattle breed of India. Keeping in view the declining population status of Nari cattle, there is a need to take up sustainable measures for its genetic improvement and conservation

Key Words: Biometry, Performance, Population status, Nari, cattle, characterization.

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INTRODUCTION

Rajasthan is the sixth largest state of India with respect to cattle population and possesses about 6.1% (12.12 million) of total cattle population of the country (199.08 million). The cattle population of this state may further be categorized as 43.62% of purebreds, 1.01% graded indigenous, 48.64% non-descript indigenous and 6.73% exotic/crossbreds. As per the milk production statistics, Rajasthan is contributing 10.6% (13.51 million tonnes) of the national milk production in 2012 (127.90 million tonnes). The milk produced in Rajasthan is shared by exotic/crossbred cattle, indigenous cattle, buffalo and goats which are contributing 7.30, 29.46, 51.10 and 12.14 percent, respectively to the total milk production of Rajasthan (2011-12). Indigenous breeds with good milk productivity viz. Gir, Rathi, Tharparkar and Kankrej are reared in this state besides, the dual purpose breeds like Hariana, Mewati and Malvi and the good quality draught breed i.e. Nagori. Four fifth of the milk produced by cattle (about 80.1%) is contributed by indigenous cattle breeds and non-descript cows. Though the proportion of non-descript cattle in Rajasthan (48.64%) is well below the national proportion of 69.65%, some more cattle population of the state may deserve the status of a breed but so far kept under the non-descript category due to lack of any systematic attempts for their characterization. One such population locally known as Nari cattle was explored so as to characterize it phenotypically by making systematic surveys in its native tract.

MATERIALS AND METHODS

The survey was undertaken in 8 villages of Bali tehsil in Pali district and 13 villages in 3 tehsils of Sirohi districts. During the survey 25 farmers of Bali and 33

farmers of sirohi district were interviewed to collect information of management and performance of Nari cattle by using a predesigned questionnarie developed for the purpose. A total of 344 animals were studied for the physical traits of the Nari cattle. The morpho-metric measurements body length (BL), Height at withers (Height), Chest Girth (CG), Paunch Girth (PG), Face Length (FL), Face width (FW), Tail Length with or without switch (TLS and TL), horn length (HL), horn circumference (HC) and ear length (EL) were recorded on 354 animals belonging to different age groups and sexes. Production and reproduction performance traits were obtained by interviewing their owners. The reproduction and production traits (age at first calving, daily milk yield, lactation period, inter-calving period and number of inseminations per conception) were recorded on 66 lactating cows. The data collected from the study were compiled and analyzed by using standard statistical procedures.

RESULTS AND DISCUSSION

Origin, geographical distribution and native environment of the breed:

At present Nari cattle are distributed in Bali tehsil of Pali district and entire Sirohi district of Rajasthan state (Figure 1). These locations lie on 24015' and 25018'North latitude 72016' and 73028' East longitude.

This cattle population has historically been named as 'Nari' by the community. Nari is derived from the word 'Nar' which means hills in the local parlance. The breeding tract of Nari cattle is at the foothill area of Aravalli hills of Rajasthan, therefore it is called as Nari. The climate of the region is semi-arid tropical. Maximum temperature of the area may go up to 450C during hottest months i.e. April to June. Annual rainfall in the area ranges from 300 to 668 mm. Maximum elevation of land in Pali and Sirohi districts are 1099 and 1722 m, respectively.

Figure 1. Geographical distribution of Nari cattle

Population status

The population of Nari cattle is reported to be about 50,000 in the two districts of Rajasthan state. The herd size of Nari cattle varied from 20 to 100, bigger herds were seen in Sirohi district as compared to Pali. The herd size was reported to be decreasing during last 2-3 decades mainly due to shrinkage in grazing land.

General management practices in rearing of Nari cattle

The Nari cattle are mainly maintained by the Raika/ Rewari communities in Sirohi and Pali districts of Rajasthan. These communities are keeping these herds as traditional business. As informed by a local NGO, Bheel and Gujars maintained this breed in the past but presently Raika community is responsible for maintaining this breed. In Bali tehsil the animals migrate to the hilly area of the Aravalli hills adjoining to Bali tehsil. In Sirohi district the Raika community migrates along with their Nari herds in November/ December every year to Gujarat state due to unavailablity of adequate feed and fodder. They cover about 200 km of distance of migration and finally stay in the places like Himatnagar (Banaskantha) or Idar Kher Brahma. The onward journey is often completed in about 30 days. The community moves along with their families including non school going childern. During the migration, the luggage is carried over donkeys/ camels. Around 4-8 raika families join together to make the herd of approximately 400- 500 animals (Figure. 2) and 8-10 donkeys are required to carry their luggage and other goods. The return journey is completed in 8-10 days mostly after onset of rains i.e. July/ August. From August to October/ November, they stay in their villages. Some Nari herds were reported to migrate upto the state of Haryana.

Figure 2. Big herd of Nari cattle

When animals were not in migration, they were kept under low input system of management. The animals were sent for grazing in forest or harvested agricultural fields from morning till evening. The grazing hours was generally 9 a.m. to 6 p.m. during which the herds covered about 2-3 km distance. The supplementary feeding to the animals was observed in the herds and animals were offered dry and green fodder by the farmers especially to the lactating cows. Some farmers offered 1-2 kg concentrate to their lactating cows. The calves up to 3 months of age were not allowed to go for grazing and kept solely on dam's milk. The feeding of the calves was directly from the teats. The farmers allowed the calves to suckle the colostrum. The breeding method opted by farmers was natural mating. About 2 to 5 bulls were available in the herds depending on the size of herd (Figure. 2). The young males started their first service at the age of 3.0-3.5 years of age and used for breeding up to the age of 10 years. The bulls were selected on the basis of their physique and conformation. The placenta was often removed in it natural course without human intervention. The practices like de-worming and de-horning were generally not observed in the management of Nari calves.

Physical Characteristics

Different parameters of physical characteristics of Nari cattle are presented as overall as well as seperately for the adult male, females and calves (table 1). The animals were strong and active with compact body. Cows were white or greyish white in colour in majority of animals i.e. 96.39% and bulls were either white (58.97%), greyish white (35.90%) or black (5.13%) (Figure 3 & 4). Face was moderate in length (44.01 and 46.22 cm in cows and bullocks, respectively) and width (14.35 and 15.58 cm in cows and bullocks, respectively), muzzle was black (64.1% in bullocks and 76.72% in cows) in majority of animals but sometimes carroty (30.77% in bullocks and 6.89% in cows) or mixed (5.13% in bullocks and 16.39% in cows) in colour. Forehead was fairly broader and slightly concave. Neck was short and stout. Horns were generally wide-spread, long, thick at bottom and pointed at tips. The shape of horns varied from straight (15.7%), curved (51.45%) and spirally curved (32.85% cases). The overall orientation of horns was mostly outward (51.74%) but forward and outward & forward orientations were also observed in 25.29% and 22.97% cases, respectively. It was interesting to note that the horns of males were mostly forward in orientation (59%) whereas, the females had the horns mostly outwards (55%). The orientation of horns in this population

Figure 3. Nari cow

Figure 4. Nari bull

was found to be unique and different from Kankrej cattle and other long horn cattle breeds of Southern India. The colour of horn was generally grey/ blackish. Majority of cows and bullocks/ bulls possessed large and well developed hump (82.95% in cows and 66.67% in bullocks/ bulls). Colour of eyelid and hooves were generally black. The ears were short, erect and horizontal in orientation in maximum cases, however, slightly drooping ears were also observed in some cases especially in males. Dewlap was large in majority of cows as well as bullocks/ bulls. The naval flap was also large in majority of cases (68.42%) and penis sheath flap was large in all the Nari animals studied in the breeding tract. The shape of udder was found to be bowl shape in majority of cases whereas, 54.72% cows had cylindrical and funnel shape teats. The teat tips were pointed in 45.28% cases and round in 54.72%. Tail

Table 1. Physical traits of Nari cattle in different age and sex groups

Trait	Class	Number of animals (% with in group)		
		Adult Male	Adult Femal	Over All
Coat Colour	Black	2 (5.13)	4 (1.31)	6 (1.74)
	White	23 (58.97)	245(80.32)	268(77.91)
	Greyish white	14 (35.90)	49 (16.07)	63 (18.31)
	Red	0 (0)	7 (2.30)	7 (2.04)
Muzzle Colour	Black	25 (64.10)	234 (76.72)	259(75.29)
	Pinkish	12 (30.77)	21 (6.89)	33 (9.59)
	Mixed	2 (5.13)	50 (16.39)	52(15.12)
Tail Colour	Black	28 (71.79)	177 (58.03)	205 (59.59)
	Creamy	4 (10.26)	88 (28.85)	92(26.74)
	Mixed	7 (17.95)	40 (13.12)	47 (13.67)
Horn Colour	Black	15 (38.46)	126 (41.31)	141 (40.99)
	Creamy	2 (5.13)	9 (2.95)	11 (3.20)
	Mixed	22 (56.41)	170 (55.74)	192 (55.81)
Horn Shape	Curved	18 (46.15)	95 (31.15)	113 (32.85)
	Spirally Curved	10 (25.64)	167 (54.75)	177 (51.45)
	Straight	11 (28.21)	43 (14.10)	54 (15.70)
Horn Orientation	Forward	23 (58.97)	64 (20.98)	87 (25.29)
	Outwards	10 (25.64)	168 (55.08)	178 (51.74)
	Forward & Outwards	6(15.39)	73 (23.94)	79 (22.97)
Ear Orientation	Horizontal	23 (58.97)	273 (89.51)	296(86.05)
	Slightly drooping	16 (41.03)	32 (10.49)	48 (13.95)
	Drooping	0 (0.00)	0 (0.00)	0 (0.00)
Hump	Large	26 (66.67)	253 (82.95)	279 (81.10)
	Medium	13(33.33)	49 (16.07)	62(18.02)
	Small	0 (0.00)	3 (0.98)	3 (0.88)
Dewlap	Large	39 (100.00)	293 (96.06)	332(96.51)
	Medium	0 (0.00)	12 (3.94)	12 (3.49)
Naval flap	Large	-	91 (68.42)	-
	Medium	-	28 (21.05)	-
	Small	-	14 (10.53)	-
Penis sheath flap	Large	39 (100.00)	-	-
Udder Shape	Bowl	-	50(94.34)	-
	Round	-	3 (5.66)	-
Teat shape	Cylinderical		29 (54.72)	-
	Funnel		24 (45.28)	-
Teat tip	Pointed		24(45.28)	-
	Round		29 (54.72)	-

was broader at base and tapered towards the end. It was long with large tuft of hair, black in colour. Basic temperament of animals was found to be docile.

Morpho-metric measurements

The height at withers, body length, chest girth, paunch girth, horn length, horn circumference, ear length, face length, face width and tail length with and without switch were recorded in 354 animal of five age/sex groups. The means along with their standard errors of nine different body measurements for all the five groups are presented in table 2. The height at withers, body length, chest girth, paunch girth were obtained as 120.87, 119.30, 153.00 and 166.90 cm, respectively in cows. The corresponding values for bullocks were estimated as 130.59, 129.22, 175.16 and 185.84 cm, respectively. Pundir et al (2011) estimated the above biometrical parameters of 407 Kankrej cows in Palanpur district of Gujarat and reported higher estimates than that of Nari cows obtained in the present study. The horn length of Nari cows estimated in this study was 51.68 cm, which was higher than Kankrej cows but the horn circumference obtained in this study was lower than that of Kankrej cows as reported by Pundir et al (2011). This indicates that Nari cows are smaller in body conformation with longer but thinner horns as compared to Kankrej cows found in same or adjoining area. The horn length of southern Indian cattle breeds like Hallikar as 35.78 cm by Singh et al (2008), Bargur as 35.2 cm by Pundir et al (2009), Khillar as 46.31 cm by Gokhale et al (2009) and Pulikulam as 37.22 cm by Singh et al (2012) were

Table 2. Morphometric traits of Nari cattle in different age and sex groups
Figures in parentheses indicate range

	Age/Sex Groups				
Parameters	**Cows (N=175)**	**Bullocks (N=27)**	**Heifers (1-3 years of age) (N=54)**	**Young males (1-3 years of age) (N=14)**	**Calves below 1 year (N=84)**
Height at withers	120.87±0.29 (112-131)	130.59±1.43 (121-154)	108.39±1.05 (89-128)	100.57±1.82 (89-116)	89.12±0.93 (68-111)
Body Length	119.30±0.37 (108-134)	129.22±1.21 (120-150)	102.50±1.03 (88-120)	89.21±2.10 (76-109)	79.95±0.86 (56-97)
Chest Girth	153.00±0.56 (137-177)	175.16±2.18 (159-207)	128.37±1.79 (104-161)	111.86±2.77 (101-136)	96.81±1.31 (64-125)
Paunch Girth	166.90±0.73 (135-198)	185.84±1.92 (170-216)	134.83±1.90 (106-172)	115.71±2.69 (98-134)	101.01±1.58 (66-132)
Horn Length	51.68±0.70 (33-76)	55.56±1.69 (41-74)	-	-	-
Horn Circumference	19.53±0.14 (14-26)	22.59±1.69 (19-27)	-	-	-
Ear Length	27.01±0.12 (17-30)	28.89±0.20 (27-32)	24.26±0.25 (20-28)	24.79±0.87 (22-35)	21.98±0.25 (15-26)
Face Length	44.01±0.16 (39-52)	46.22±0.0.46 (43-53)	37.17±0.44 (29-45)	33.00±0.88 (28-40)	28.55±0.35 (19-38)
Face Width	14.35±0.07 (12-17)	15.58±0.23 (14-19)	12.85±0.12 (11-15)	11.93±0.32 (10-14)	10.77±0.14 (7-15)
Tail Length	92.63±0.52 (72-111)	98.26±1.08 (90-116)	77.19±1.49 (60-104)	67.69±1.94 (56-83)	59.30±1.05 (35-93)
Tail Length with Switch	116.40±0.50 (100-132)	124.30±1.20 (117-138)	92.98±1.96 (75-123)	83.43±3.13 (68-114)	70.15±1.05 (40-97)

lower than that of horn length of Nari cattle obtained in the present study, which clearly indicated that the horn of Nari cattle is perhaps biggest in all the Indian cattle breeds. The face length of Nari cows (44.01cm) are comparable with Kankrej cows (44.09 cm) as reported by Pundir et al (2011). The tail length of Nari cows as obtained in the present study was slightly higher than that of Kankrej cows (Pundir et al, 2011). The biometrical parameters of Nari cattle revealed that this cattle population is different from Kankrej and other cattle found in Pali and Sirohi districts of Rajasthan and deserve a status of a distict breed of cattle of Indian origin.

Performance

The milk yield of the Nari cows varied from 3 to 8 kg per day with an average of 5.36 kg per day. The age at sexual maturity in males was about 3.0 to 3.5 years and age at first calving of cows was between 3.5 to 5.0 years of age. On an average 8-10 calvings in a life span of 20 years were observed in the herds. The cows in the herd showed good reproductive health and repeat breeding was to the extent of maximum 3% only. The lactation length varied from 9 months to 15 months depending upon sex of calves, less in male calves and more in female calves. The inter-calving period varied between 15 to 24 months.

The animals are adapted to hot climate in the areas of foothills of Aravalli and perform better than other cattle breeds in that area. The animals can well survive on grazing and in the open housing system in all kinds of weather. These animals are contributing significantly in the livelihood of Raika community in terms of medium to moderate milk production and bullocks. The animals are more resistant to communicable and parasitic diseases as compared to crossbreds in that area under hot and humid climate. The bullocks of this breed are active and well suited to agricultural operations and local transport but due to mechanization of agriculture, the farmers generally sell the male calves at the age of 1 to 2 years to the farmers/ businessmen coming from Madhya Pradesh and Gujarat states. Adult bullock pair of Nari cattle costs about Rs. 20 - 25 thousand.

Recommendations and conclusions

Nari cattle population is a unique population in terms of the physical feature and management of the animals. Therefore, this population needs to be registered as a recognized distinct cattle breed of India. Keeping in view the declining population status of the breed, there is a need to take up sustainable measures for the improvement and conservation of this population. A nucleus herd may be established in the breeding tract for production of bull calves and studies on the qualities of the Nari cattle specially the disease resistance, tolerance of hot and humid climatic conditions in open housing system may be initiated. Shrinkage in grazing land area and unavailability of adequate drinking water are major constraints which are adversely affecting the population status of the breed. These problems should be well addressed by the Forest and Animal Husbandry departments of state government. A Breed Society may also be established for protecting the interest of the owners of this breed.

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