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PREFACE

The name of the breed 'Kenkatha' is derived from the Ken river that separates Uttar Pradesh and Madhya Pradesh states of union of India. The breed is reputed for draft quality in the breeding tract and has been providing farm power over the years. This breed is also locally known by the names of 'Kenpari' and 'Kenwaria' in the area. Animals of the breed are well adapted to the hot and dry agro climatic conditions prevalent in the area. Breed is sustaining on poor quality of feed and fodders existing in the breeding tract. The Kenkatha animals are widely distributed in Lalitpur, Banda, Hamirpur, Mahoba and Chitrkoot districts of Uttar Pradesh and Tikamgarh and Chhatarpur districts of Madhya Pradesh. Animals of the breed are medium in size. Body colour is predominantly white or gray. Body is long, compact and cylindrical in shape. Hump is short in females and short to moderate in males. Bullocks of the breed are reared in intensive management whereas cows, heifers and calves under extensive management locally known as *Anna Partha*. Cows yielding 500-600 kg of milk in a lactation period of 6-8 months. Bullocks of the breed are utilized for light to moderate work. The survey conducted in the breeding area revealed a substantial number of animals of this breed. There is no organized farm for the production of elite bulls and improvement of the breed in the country. The foremost problems existing in the breeding tract include non availability of proven bulls and water for drinking. Hardly any published information is available on this breed. In the present document an attempt has been made to detail the characteristics of the breed based on information generated in its breeding tract and by compiling all the possible available information especially on habitat, physical characteristics, production performance and genetic characterization through microsatellite markers. This monograph will be useful to researchers, academicians and planners for formulating programmes and strategies for the improvement and conservation.

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(Authors)

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Introduction

Indigenous cattle of India have been classified into 3 groups based on their utility i.e. milk, draft and dual purpose (both milk and draft). Lion's share of the indigenous breeds has been evolved largely either for work or dual purpose. However, due to upsurge in mechanization in agricultural operations, draft breeds are loosing their grounds and are presently existing only in resource poor conditions areas of the country or the areas which are not conducive for mechanical agricultural operations like hilly areas. Consequentially, the country's cattle population declined by in so far as 10.06% during 1997 to 2003 period. The current cattle population of the country stands at 185 million (Livestock census, 2003). Unfortunately, livestock census in the country is undertaken species wise and thus primary information about the status and population dynamics of a given breed cannot be determined. Additionally, hardly any published information was available on Kenkatha breed in literature. In the present study an attempt has been made to characterize the breed under natural habitat conditions and compile all available findings in the form of a monograph on this important draft breed.

The name of the breed is drawn from the name of Ken River that separates Uttar Pradesh and Madhya Pradesh states of union of India. Kanwaria and Kenpari are the other names of breed commonly used in the breeding tract. The animals of the breed are available in Lalitpur, Banda, Hamirpur, Mahoba and Chitrkoot districts of Uttar Pradesh and Tikamgarh and Chhatrapur districts of Madhya Pradesh. The breed is considered a close relative of Hariana breed of cattle. The farming community of the area developed this breed over centuries primarily for utilization as bullock power. Animals of the breed are well adapted to the agro climatic conditions of the area. Breed is sustaining on poor quality feed and fodders available in the breeding tract. No organized farm exists for the breed for this production of quality bulls and genetic improvement in the country.

Habitat

The breeding tract lies approximately between the Tropics of Cancer and 26^0-north latitude, and between 78^{0}5′ and 81^{0}6′ east latitude. The soil types in the breeding tract are mainly domat (bhuri) and black (cotton) type. Both types of the soils are fertile. Temperature ranges from 5 to10°C (December to March) to 45-48°C

(May-June). The breeding tract receives scanty rains during rainy season i.e. July to August. Occasionally this area faces drought conditions especially in the months of May and June. The depth of the sub soil water is 250-300 feet. Most of land is unirrigated. The major crops grown in the area included Wheat (*Triticum aestivum L*), Gram (*Cicer arietinum L.*), Maize (*Zea mays L.*), Jowar (*Sorghum bicolor L. Moench*), Bajara (*Pennisetum typhoides*), Mustard (*Brassica sp*), Groundnut (*Arachis hypogaea L.*), Soyabeen (*Glycine max L Merril*), Oat (*Avena sativa*), and Berseem (Trifolium

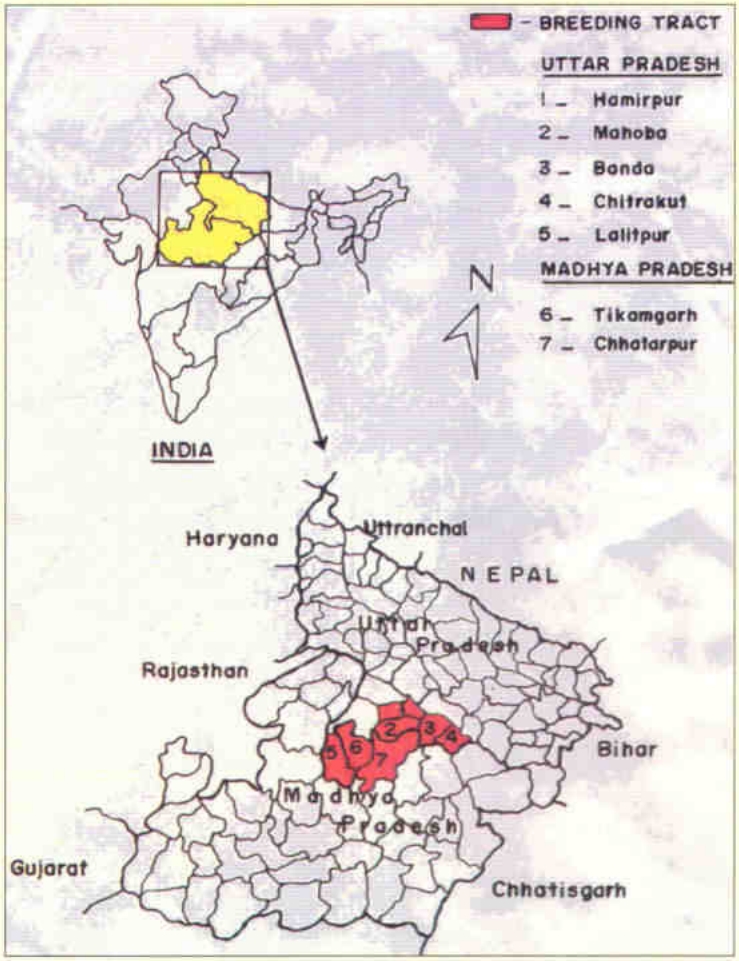

Fig. 1: Breeding tract of Kenkatha cattle

Fig. 2: Soil type and natural vegetation in the breeding tract

alexandrinum L.). The concentrate generally fed to animals included a combination of wheat, gram, cottonseed and groundnut cake (GNC). The breeding tract and type of soil are shown in figure 1 & 2 respectively.

Status

Breed wise population is not available in the census report of the country. However, analysis of the cattle population trend from 1982-1997 and 1997-2003 indicated a decline of 15.69% and 7.32% in Uttar Pradesh and 26.36% and 5.27% in Madhya Pradesh, respectively. In contrast, the cattle population of the country as a whole increased by 6.98% from 1982 to 1997 and then declined by 10.06% from 1997 to 2003. The buffalo population in both the states as well as the country has shown an increasing trend over the same duration. The populations of cattle in the breeding tract showed that majority of the cattle (more than 80%) did not characteristically conform to established breeds and are commonly described as non descript. The other breeds available in the breeding tract were Hariana, Malvi and Tharparkar. The survey conducted in the breeding tract revealed that animals of the breed exist in good numbers and the breed did not fall in endangered category for the purpose of conservation as per the prescribed standards. However, a genetic improvement program on breed in the breeding tract is required on priority.

Survey

To elucidate the characteristics of the breed, a survey was conducted in Lalitpur, Banda and Chitrkoot districts of Uttar Pradesh and Tikamgarh district of Madhya Pradesh. A total of 81 farmers were interviewed to record information on management, utility, physical characteristics and performance from the 11 villages of Uttar Pradesh and 2 villages of Madhya Pradesh. Total eight body measurments were recorded on 239 animals of different age and sex. The survey conducted revealed that animals of this breed are in good number in the breeding tract. However, there is no organized program for the genetic improvement of the breed in the breeding tract. Semen of the breed was not available in A.I. centers of the state animal husbandry department. Farmers raise Bullocks of the breed under intensive management and calves, heifers and cows in extensive system of management. There was an acute shortage of good quality bulls of the breed in the entire breeding tract. Among the surveyed farmers, 32% farmers were 8th passed, 22% up to 10th, 14% up to 12th and 11% graduates. The data on land holding of farmers showed that about 12% of the surveyed farmers did not possess any land, 32% farmers had 1-5 acres, 30% farmers from 5-10 acres, 18% farmers from 10-20 acres and merely 8% farmers had more than 20 acres of land. For the most part the land was unirrigated. A small number of farmers had tube wells for irrigation. Water was the foremost problem for the agriculture and as a result most of the area is rain fed. During the summer months majority of the tube wells get dry. The most central problems in the breeding tract were the non-availability of good quality bulls, acute shortage of water for drinking for the animals and crop production. There was no crop farming from April to July due to non accessibility of irrigation facilities, agricultural fields were kept open for grazing.

Physical Characteristics

Animals of the breed are white and gray in body colour. Skin colour is black. Animals are small to medium in size. Body is long, compact and in cylindrical shape. Colour of the muzzle and eyelids is black. Ears are moderate in length, horizontal and not dropping. Face is short and dished shaped. Neck is long and dewlap is large. Hump is short in females and short to moderate in males.

Fig. 3: A typical calf of the breed

Fig. 4: A representative Kenkatha cow

Fig. 5: A characteristic Bull of the breed

Fig. 6: Facial characteristics of a typical Kenkatha cow

Horns are black in colour and emerge from outer polls, thick from base and getting thinner to the tip. Tip of the horn is pointed. Horns are curved in the semi circle shape. The penis sheath flap is tight. Udder is small and not well developed. Fore udder and rear udder sizes are small. Teats are short. Teat shape is cylindrical and in few cases, it was funnel shaped. The teat tip is flap (90%) and pointed (10%). Milk veins are small and not well developed. Representative calf, cow, bull and face of a cow are shown in Figures 3 to 6, respectively.

Management Practices

In the breeding tract animals were reared following all the three management systems i.e. intensive, semi intensive and extensive. Bullocks of the breed were reared mainly in the intensive management. They were stall fed and provided concentrate @ 0.5 to 2.0 kg per day during working days. Cows, heifers and calves of the breed were maintained mainly under the extensive system locally known as the *Anna- Pratha*. From April to July, majority (over 80%) of farmers did not tie their animals, which were let loose in jungle and reared only on grazing, while about 20% farmers tied their animals during night only and provided some fodders at stall. From August to March, 80% of the farmers tied their animals during night only. Some farmers followed semi intensive management system as well. The farmers, especially the landless, were rearing cows for milk production and sold

Fig. 7: A typical animal house in the breeding tract of Kenkatha cattle

Fig. 8: Bullocks of the breed maintained under intensive management

Fig. 9: Cows of the breed in grazing land

Fig. 10: Traditional method of storage of dry feeds

the milk as their source of the income. The sale of the male calf was another good source of the income for the farmers. In the rearing of animals ladies, children, men as well as old people were involved. The breed is reared for bullock power, milk, manure and energy for cooking. Sale and purchase of the animals were observed among farmers and through fairs. Animal houses were open, kachha and separated from the human residences. Floors of the animal houses were kachha. Animal houses were with proper ventilation and tree shades. However, drainage of the houses were not proper and hardly any attention was paid to proper cleaning. During milking udder and milk pots were washed with simple water. Vaccinations against Black Quarter, Rinder pest, Foot and Mouth disease and Haemorrhagic Septicaemia were carried out in some of the cases. The herd size ranged from 2 to 5 animals, in some cases it was observed as high as 20. Some person adopted it as their profession to take out the animals for grazing and charging @ 10 per animals per month from the owners. The representative animal house, bullocks under intensive management, cows in the grazing land and traditional storage of feeds are shown in figure 7 to 10, respectively.

Performance

The birth weight of calves ranged from 18 to 22 kg. Weight at 12 months, 24 month, first mating and first calving ranged from 60-80, 120-150, 230-260 and

250-300 kg, respectively. All the weights observed in the study were within the range obtained by Joshi *et al.* (1995), Singh and Pundir (2002) and Pundir *et al.* (2005) in Hariana, Gangatiri and Red Kandhari cattle, respectively. The age at first ejaculation and mating in males was 3.0 and 4.0 years, respectively. The age at first fertile service and age at first calving ranged from 3-5 and 4-6 years, respectively, similar to the reports of Joshi *et al.* (1995), Singh and Pundir (2002) and Pundir *et al.* (2005). The daily milk yield ranged from 1.0 to 3.0 kg, as also reported by Pundir *et al.* (2005) but lower than reported by Joshi *et al.* (1995) and Singh and Pundir (2002). Cows producing up to 5.0 kg of milk in a day were also identified. The average peak yield was 3.0 kg, which was attended between 40 to 48 days after calving. The peak milk yield was lower than the Gangatiri breed (Singh and Pundir, 2002). Cows were yielding 500-600 kg of milk in a lactation period of 6-8 months, similar to as reported by Pundir *et al.* (2005) and lower than reported by Joshi *et al.* (1995) and Singh and Pundir (2002). The service period, dry period and calving interval ranged from 4-6 months, 6-8 months and 15-18 months, respectively. All the three observations were within the range reported by Joshi *et al.* (1995), Singh and Pundir (2002) and Pundir *et al.* (2005). Bullocks of the breeds were utilized for light to moderate work. One pair of bullock could plough 0.4 hect of land in a day and cart 6-8 quintals of load with a speed of 6-8 km/ hour.

Morphometric Traits

A total of 239 animals of different age and sex were recorded for eight different body measurements from the breeding tract. These comprised of 120 males and 119 females. Bullocks/ bulls of the breed had significantly higher body measurements than the cows of the same age. Cows in the Lalitpur district had significantly lesser values for different body measurements as compared to cows from Banda district. The average body length, heart girth, height at withers, paunch girth, face length, ear length, horn length and tail length in cows were 116, 142, 111, 149, 43, 21, 18 and 76 cm, respectively. The corresponding measurements in bullocks/ bulls were 138, 166, 129, 176, 49, 26, 24 and 92 cm, respectively (Table-1). All the body measurements at different ages and sex were in close agreement with the reports of Singh and Pundir (2002) and Pundir et *al.* (2005) in Gangatiri and Red Kandhari cattle breeds, respectively.

Table-1: Age and sex wise body measurements (cm) of Kenkatha cattle

Age	Sex	Body length	Height at wither	Heart girth	Paunch girth	Face length	Ear length	Horn length	Tail length without switch
0-3 Months	M	65.0±8.0 (4)	70.0±8.3 (4)	76.5±9.3 (4)	74.7±11.0 (4)	24.5±3.2 (4)	14.2±2.5 (4)	—	40.0±6.2 (4)
3-12 Months	M	75.4±1.7 (25)	81.2±1.5 (25)	82.8±2.8 (25)	83.0±3.2 (25)	27.6±0.9 (25)	17.4±0.5 (25)	—	46.5±1.6 (25)
3-12 Months	F	76.6±1.7 (23)	79.8±1.6 (23)	82.3±2.7 (23)	81.9±3.5 (23)	27.6±0.8 (23)	17.5±0.4 (23)	—	46.2±1.3 (23)
1-3 Years	M	99.8±4.0 (14)	100.2±3.5 (14)	113.0±5.9 (14)	120.1±6.6 (14)	38.0±2.0 (14)	20.6±0.8 (14)	8.0±2.0 (6)	63.0±4.5 (14)
1-3 Years	F	96.0±3.7 (17)	96.0±2.8 (17)	115.2±4.4 (17)	121.7±5.6 (17)	36.5±1.3 (17)	18.5±0.9 (17)	12.8±0.9 (9)	61.0±3.6 (16)
Above 3yrs	Cow	116.2±1.6 (79)	111.5±1.1 (79)	142.0±1.1 (79)	149.9±1.9 (79)	43.4±0.8 (79)	20.9±0.5 (79)	17.7±0.6 (79)	76.1±1.2 (79)
Above 3yrs	Bull/ Bullock	138.5±1.6 (77)	129.2±1.2 (77)	166.1±1.8 (77)	176.6±2.0 (77)	49.2±0.4 (77)	25.9±0.3 (77)	24.4±1.0 (77)	91.7±1.1 (74)

The present study, thus recorded the breed characteristics and related parameters of Kenkatha breed derived from the breeding area based on a methodological survey. No such earlier information existed for this valuable draft breed. Though good numbers of animals of the breed exist in the breeding area yet there is no improvement policy in operation for further advancement of the breed to make it sustainable under the fast changing agricultural scenario of the country. The study highlights the urgent need for initiating instant steps towards providing high genetic merit breeding males in the area to further improve the breed towards its economic sustainability.

Genetic Characterization

A total of 47 Blood samples from unrelated Kenkatha animals of the breeding tract were collected. Genomic DNA was isolated following standard procedure with slight modifications. A set of 21 microsatellite markers recommended for cattle in FAO's DADIS-MoDAD programme were utilized for generating microsatellite

genotyping data in a panel of 47 animals. Since microsatellite markers are co-dominant, 47 samples correspond to 94 alleles for each microsatellite locus. An amalgamation of 21 co-dominant loci and 47 samples were projected to create 1,974 allelic data for the population included in this study.

Observed and expected heterozygosity estimates were computed as per Nei (1973) as executed in POPGENE software (Yeh *et al.*, 1999). The observed and effective number of alleles were also evaluated using POPGENE software. Allelic frequencies were utilized for assessing Polymorphic Information Content (PIC) values as per Botstein *et al.* (1980). The PIC value was estimated as per formula given below

$$PIC = 1 - \sum_{i=1}^{k} x_i^2 - \sum_{i=1}^{k-1} \sum_{j=i+1}^{k} 2x_i^2 x_j^2$$

Where k is the number of alleles and x_i and x_j are the frequencies of the i^{th} and j^{th} alleles, respectively.

Departure from Hardy-Weinberg equilibrium was derived using the exact test of POPGENE. Heterogeneity of deviations from Hardy-Weinberg equilibrium among the microsatellite loci was investigated by considering the deviations as correlation coefficient and tested accordingly (Barker *et al.*, 2001). Heterozygote deficiencies were articulated as $F_{IS} = (H_o - H_e) / H_e$ where, H_o and H_e are the observed and expected frequency of heterozygotes, respectively. Linkage (Genotypic) disequilibrium among the microsatellite loci was analyzed employing F-STAT version 2.9.3, (Goudet, 1995) for 21 microsatellite loci. Finally, the bottleneck hypothesis was explored exercising BOTTLENECK 1.2.01 software (Cornuet and Luikart, 1996).

The investigated 21 bovine microsatellites represent 16 autosomal chromosomes of cattle and all were amplified in Kenkatha cattle. All these loci, which have been identified to be polymorphic in a variety of *Bos taurus* and *Bos indicus* breeds (Mac Hugh *et al.*, 1997; Edwards *et al.*, 2000; Kim *et al.*, 2002; Dorji *et al.*, 2003; Jordana *et al.*, 2003; Metta *et al.*, 2004; Mukesh *et al.*, 2004) amplified successfully and produced definite banding patterns from which individual genotypes could be ascertained. Genetic variability parameters of Kenkatha cattle viz., observed and effective number of alleles, observed, expected and Nei's expected heterozygosity,

polymorphic information content (PIC) and heterozygote deficiency at each of the 21 microsatellite loci are presented in Table 2.

Table-2: Measures of genetic variation in Kenkatha cattle

Locus	N_o	N_e	PIC	Heterozygosity[a]			Heterozygote deficiency, f (F_{IS})
				Observed	Expected	Nei's	
ILSTS006	8.0	3.3011	0.6645	0.3696	0.7047	0.6971	0.478
BM1824	5.0	2.1871	0.4856	0.4130	0.5487	0.5428	0.249
INRA063	5.0	2.6988	0.5631	0.6170	0.6362	0.6295	0.031
BM1818	7.0	4.7505	0.7599	0.5532	0.7980	0.7895	0.309
ILSTS054	6.0	4.6505	0.7513	0.8261	0.7936	0.7850	-0.041
ILSTS034	10.0	4.4770	0.7544	0.6047	0.7858	0.7766	0.233
INRA005	5.0	4.4853	0.7404	0.6207	0.7907	0.7771	0.218
HAUT27	4.0	2.3467	0.5115	0.2500	0.5805	0.5739	0.572
ILSTS033	5.0	2.7702	0.5807	0.4000	0.6462	0.6390	0.384
HEL9	5.0	4.7190	0.7543	0.5789	0.7986	0.7881	0.278
CSRM60	9.0	4.4457	0.7518	0.3778	0.7838	0.7751	0.521
ILSTS011	3.0	2.4985	0.5327	0.3333	0.6065	0.5998	0.453
ILSTS005	6.0	3.7413	0.6889	0.7381	0.7415	0.7327	0.005
ETH10	5.0	2.8960	0.6123	0.5000	0.6622	0.6547	0.247
HEL1	6.0	2.3283	0.5367	0.5610	0.5775	0.5705	0.029
INRA035	8.0	5.4362	0.7918	0.7556	0.8252	0.8160	0.085
MM8	5.0	2.7400	0.5723	0.7561	0.6429	0.6350	-0.179
ILSTS030	4.0	2.6065	0.5491	0.7234	0.6230	0.6163	-0.163
MM12	9.0	4.2618	0.7362	0.6739	0.7738	0.7654	0.130
ETH225	6.0	2.1038	0.5008	0.3830	0.5303	0.5247	0.280
HEL5	4.0	2.1559	0.5912	0.3077	0.5431	0.5362	0.437
Mean	5.95	3.4095	0.6395	0.5401	0.6854	0.6774	0.214
SD	1.88	1.0851	0.101	0.1707	0.1002	0.0989	

N_o Observed number of alleles

N_e Effective number of alleles [Kimura and Crow (1964)]

[a] Expected heterozygosity were computed using Levene (1949) and Nei's (1973) expected heterozygosity

PIC(polymorphic Information Content)

A total of 125 distinct alleles at the 21 scrutinized microsatellites were identified in Kenkatha cattle. The allele frequency data revealed a reasonable amount of polymorphism in Kenkatha cattle . The number of observed alleles varied between 3 (ILSTS011) and 10 (ILSTS034) with an overall mean number of 5.95±1.9 alleles per locus. All the 21 microsatellites signified ample polymorphism and their suitability for evaluating genetic variation within breed and exploring genetic differences between breeds. The observed number of alleles for all the 21 loci exceeded the effective number of alleles which varied from 2.10 (ETH225) to 4.75 (BM1818) with a mean of 3.41±1.09 .

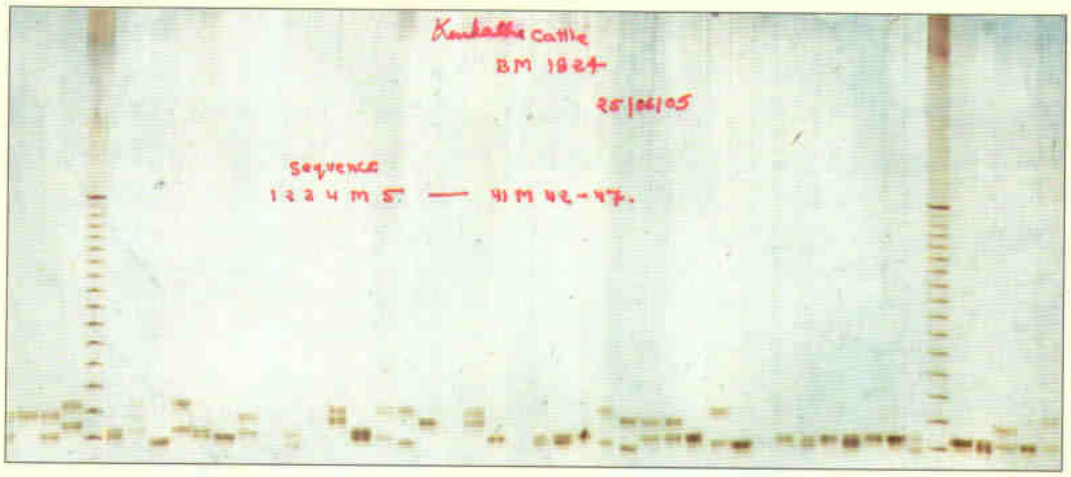

Fig. 11: A typical PAGE gel showing different alleles at a locus

The average PIC estimate was 0.639±0.101. Genetic markers demonstrating PIC values higher than 0.5 are considered informative in population genetic analyses. Consequently, with the exception of BM1824 all the loci were really informative in Kenkatha breed like in taurine and indicus breeds investigated earlier using microsatellite markers (Bradley *et al.*, 1994; Canon *et al.*, 2001; Maudet *et al.*, 2002; Kumar *et al.*, 2003; Metta *et al.*, 2004; Mukesh *et al.*, 2004).

The observed heterozygosity averaged over the 21 loci was 0.540±0.171 which was lower than the expected heterozygosity (Table 2). The average expected heterozygosity within the Kenkatha population ranged from 0.530 (ETH225) to 0.825 (INRA035) with an overall mean of 0.685±0.10. Kenkatha cattle, thus, possess considerable amount of genetic variation derived from its gene diversity. The average

observed heterozygosity estimation in this study (0.540±0.171) was marginally lower than illustrated in seven Italian cattle breeds 0.6-0.68 (Del Bo *et al.*, 2001) and five Swiss cattle breeds 0.60-0.69 (Schmid *et al.*, 1999). Fairly comparable levels of heterozygosity were reported in Deoni cattle breed (0.59) of India (Mukesh *et al.*, 2004) and twelve west/central African cattle breeds 0.506-0.697 (Ibeagha-Awemu *et al.*, 2004). However, lower heterozygosity (0.42) and reductions in number of alleles than Kenkatha have been recounted in Sahiwal cattle breed of India (Mukesh *et al.*, 2004) whose populations is on a rapid decline in India.

There is a negative correlation between observed heterozyosity (Sahiwal, 0.42; Gangatiri, 0.46 (Our study); Hariana 0.53; Kenkatha 0.54 and Deoni 0.59) and F_{IS} (Sahiwal, 0.32; Gangatiri, 0.31; Hariana, 0.21; Kenkatha, 0.21 and Deoni 0.17) in India Zebu cattle. H_o shows increasing trend with the decline in F_{IS} of these breeds. This clearly indicates that Kenkatha cattle retain considerable genetic variability and moderate level of inbreeding, notwithstanding its declining population in the breeding region.

Within-population inbreeding estimate f (F_{IS}) was significantly positive as derived from table wide randomizations ($P< 0.05$). The f-estimates ranged between -0.179 and 0.572 with an average of 0.214. Thus, on an average, deficiency (21.4%) of heterozygote existed in the Kenkatha population. All the 21 microsatellite markers, except ILSTS054, MM8 and ILSTS030 contributed to this observed heterozygote shortage. It is right time to initiate planned and organized breeding, as F_{IS} is indicative of moderate level of inbreeding in the population.

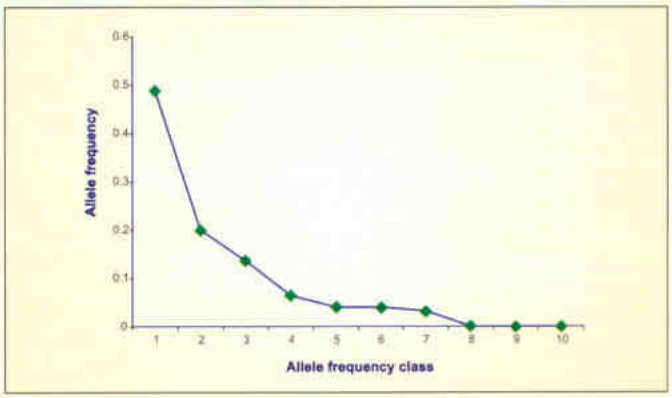

Fig. 12: *Mode shift curve depicting lack of bottleneck in Kenkatha cattle*

The population bottlenecks induce a transient excess of heterozygosity. Any population that has experienced a recent bottleneck will show higher than the expected (equilibrium) heterozygosity for the large majority of loci. Three tests were used to look for bottleneck in the Kenkatha cattle viz Sign test, Standardized difference test and Wilcoxon rank test. Results of all the three tests showed absence of bottleneck. With the help of quantitative as well as qualitative methods it can very well be concluded that Kenkatha population has not undergone genetic bottleneck in the past.

In conclusion, using neutral genetic markers it is evident that despite unplanned breeding, this breed still has sufficient genetic variability. Hence the genetic variation that has persisted in Kenkatha population could provide a valuable source of genetic material that may be used for meeting the demands of future breeding programmes. High priority action is necessary considering the husbandry practices exercised by local farmers, which may further weaken the diversity levels through the breeding of relatives. To make a start, breed society needs to be formed, which should be educated and supported for the comprehensive safeguarding and upgrading of the breed to make it economically sustainable in the present agricultural scenario of the country. Exodus of purebred males from the breeding tract need to be curbed and availability of proven males as well as frozen semen of the breed be ensured in the breeding tract.

Recommendations

1. A nucleolus farm having at least 250-350 cows and 20 bulls should be established in the breeding tract on priority.
2. An improvement program in the shape of open nucleolus breeding scheme (ONBS) should be initiated in the breeding tract.
3. Animals true to the breed should be registered under herd registration program in the breeding tract.
4. "Kenkatha" breed should be developed as draft breed.
5. Farmers should be made aware about the draft quality of the breed and be encouraged to formulate a breed society.
6. A detailed study on the pattern of NBAGR-Net Work Project for the evaluation of breed in its native tract should be carried out.

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