

Deoni cattle breed of India. A study on population dynamics and morphometric characteristics

G. Singh, G.K. Gaur, A.E. Nivsarkar, G.R. Patil & K.R. Mitkari

*National Bureau of Animal Genetic Resources, Post Box No. 129,
G. T. Road Bypass, Karnal 132 001 Haryana, India*

Summary

Deoni is an important dual-purpose breed of cattle in Maharashtra. These animals are mainly found in the Latur district and the adjoining area of Prabhani, Nanded and Osmanabad districts of the Marathwada region of Maharashtra. From 1996 to 1999, a systematic survey was conducted in 13 strata involving 69 villages to determine geographic distribution, establish breed characteristics, determine socioeconomic status and existing management practices as well as to estimate the approximate population of Deoni cattle in its breeding tract. The total number of households enumerated was 9 132. The average herd size was 2.5 animals with a range of 1 to 16. About 30 percent of farmers were found rearing Deoni cattle. The total population of the Deoni in the entire breeding tract was estimated at 118 945. A decrease in Deoni cattle population (8.78 percent) was also noticed from August 1996 to August 1998.

Deoni is a medium heavy animal. It is found in three-colour variations viz. Wannera, Balankya and Shevera. The body is moderately developed and symmetrical with distinct muscles. Horn length, ear length, head length, chest girth, body length and height averaged 17.61, 26.18, 49.82, 151.82, 120.11 and 122.22 cm in adult cows and 19.97, 26.67, 53.68, 163.55, 129.59 and 134.36 cm in bullocks. Lactation milk yield averaged 868 litres. The average fat content in the milk of Deoni cows was 4.3 percent. Cows showed

their first estrus at the average age of 36 months. Average age at first calving was 46 months. Service period and inter-calving period averaged 170 and 447 days. The selected bulls started breeding at the age of 30 months. Calf and adult mortality was found to be negligible and the breed was found to be hardy and well adapted to tropical draught prone areas. The declining trend of the Deoni cattle breed calls for immediate steps to control the reasons. Regarding conservation and improvement, both models need to be implemented effectively to make the programme successful.

Resumen

La Deoni es una raza vacuna de doble propósito originaria de Maharashtra. Estos animales se encuentran principalmente en el distrito de Latur y las zonas vecinas de Praghani, Nanded y Osmanabad, en el distrito Marathwada de en la región de Maharashtra. Entre 1996 y 1999 se llevó a cabo una encuesta sistemática en 13 zonas que comprendían 69 poblados con el fin de determinar la distribución geográfica, establecer las características de la raza, determinar el estatus socioeconómico y las prácticas de conducta existentes, así como hacer una estimación de la población aproximada existente de la raza Deoni en su habitat. El total de familias propietarias fue de 9 132, y la media de animales por familia de 2,5, con un espectro de 1 a 16. Alrededor del



Figure 1. A Deoni cow.

30% de los agricultores resultó ser criados de la raza Deoni. La población total de Deoni en la zona originaria fue establecida en 118 945, y se observó una disminución de la raza del 8,78% entre agosto 1996 y agosto 1998.

Se trata de una raza de peso medio que se subdivide según una variación de tres colores: Wannera, Balankya y Shevera. El cuerpo se presenta bastante desarrollado y simétrico con músculos visibles. La longitud de los cuernos, orejas, cabeza, circunferencia torácica, longitud del cuerpo y altura media son respectivamente de 17,61; 26,18; 49,82; 151,82; 120,11; y 122,22 cm en los animales adultos y de 19,97; 26,67; 53,68; 163,55; 129,59; y 134,36 cm en los novillos. El rendimiento medio por lactación es de 868 litros. El contenido medio en grasa en la leche de la raza Deoni es de 4,3%. Las hembras presentan el primer estro hacia la edad de 36 meses, y la media de edad al primer parto es de 46 meses. El periodo de monta y el intervalo entre partos es de 170 y 447 días. Los machos seleccionados se utilizan en reproducción a partir de los 30 meses. Se consideró que la mortalidad de crías y adultos no representaban un dato importante ya que la

raza se presenta fuerte y bien adaptada a las zonas secas tropicales. El declive de la raza Deoni ha provocado una serie de medidas inmediatas para averiguar los motivos. En cuanto a la conservación y la mejora ambos modelos necesitan ser mejorados para conseguir un programa de éxito.

Keywords: *Distribution, Characteristics, Population dynamics, Management practices.*

Introduction

Deoni is an important dual-purpose cattle breed of Maharashtra. These animals are mainly found in the Latur district and the adjoining area of Parbhani, Nanded and Osmanabad districts of the Marathwada region of Maharashtra. The name of the breed is derived from Deoni Taluk of the Latur district. The breed is also known as Surti, Dongarpati and Dongri. It is found in three colour variations viz. Wannera (clear white with black colour at the sides of the face), Balankya (clear white with black spots on the lower side of the body) and Shevera (white

body with irregular black spots). Deoni cattle are hardy and well adapted to their breeding tract constituting an important cattle genetic resource of Maharashtra.

Present status of a livestock breed in terms of population size and the breed characteristics is essential to formulate the conservation and improvement strategies for the breed. A systematic survey was, therefore, undertaken to determine geographic distribution, establish breed characteristics, determine socioeconomic status and existing management practices and to estimate the approximate population of Deoni cattle in its breeding tract during the period 1996 to 1999.

Materials and methods

The Deoni breeding tract with a total area of about 11 240 km² is located approximately between 17° 35' and 20° 05'N and between 75° 16' and 78° 15'E. The elevation of the breeding tract ranges from 409 to 455 m above mean sea level. The climate of the Deoni breeding tract is generally hot throughout the

year except for some winter months. The average temperature varies from 9 to 44°C and the average relative humidity from 40 to 54 percent. The tract receives maximum rains during June to September. The mean annual rainfall varies from 750 to 990 mm.

A total of 10 strata from the Latur district and one stratum each from the Parbhani, Nanded and Osmanabad districts of Maharashtra State (India) were selected for the survey of Deoni cattle. From each stratum five to six villages were further randomly selected. Thus, the total survey was conducted in 13 strata involving 69 villages. Information on geographical distribution of breed, socioeconomic status of the farmers, category wise enumeration of the population (calves, young stock, milking females, dry females, working males and bulls), feeding and management practices followed and disease aspects were collected. Morphological, conformational as well as production and reproduction characteristics of Deoni cattle were recorded for phenotypic characterization of Deoni breed.



Figure 2. A Deoni bull.

Table 1. Body measurements \pm SE of different category of Deoni cattle.

S. N.	Category	Records	Horn length (cm)	Ear length (cm)	Head length (cm)	Chest girth (cm)	Body length (cm)	Height at withers (cm)
1.	Calves (0-3 months)	188	--	17.34 \pm 0.52	27.22 \pm 0.83	78.82 \pm 2.19	68.18 \pm 1.43	76.42 \pm 1.32
2.	Calves (4-6 months)	246	--	19.57 \pm 0.60	31.88 \pm 1.20	94.56 \pm 3.85	78.45 \pm 1.86	86.45 \pm 1.87
3.	Calves (7-9 months)	288	--	21.54 \pm 0.48	36.39 \pm 1.03	107.01 \pm 3.26	87.93 \pm 1.98	93.78 \pm 2.20
4.	Calves (10-12 months)	317	0.95 \pm 0.38	23.06 \pm 0.46	38.86 \pm 1.03	114.53 \pm 3.31	93.30 \pm 2.34	98.51 \pm 3.46
5.	Calves (13-18 months)	373	2.39 \pm 0.35	24.58 \pm 0.34	41.94 \pm 1.09	124.97 \pm 2.73	101.56 \pm 1.50	107.94 \pm 2.32
6.	Calves (19-24 months)	354	3.76 \pm 0.46	25.39 \pm 0.43	44.73 \pm 1.06	129.73 \pm 5.31	103.52 \pm 2.59	112.50 \pm 2.23
7.	Calves (> 24 months)	368	6.16 \pm 0.74	27.52 \pm 0.35	48.01 \pm 0.93	144.83 \pm 2.81	116.43 \pm 2.06	122.06 \pm 2.39
8.	Bulls	52	7.19 \pm 1.29	25.48 \pm 1.30	54.87 \pm 7.10	173.61 \pm 6.08	135.13 \pm 7.60	139.55 \pm 6.25
9.	Bullocks	731	19.97 \pm 0.92	26.67 \pm 0.34	53.68 \pm 0.83	163.55 \pm 1.55	129.59 \pm 2.28	134.36 \pm 2.03
10.	Cows	1007	17.61 \pm 0.74	26.18 \pm 0.52	49.82 \pm 0.91	151.82 \pm 1.92	120.11 \pm 2.16	122.22 \pm 1.23



Figure 3. A Deoni cow with a calf.

Seventy animals from each village and 350 from each stratum were taken for the study. Physical measurements of the calves were recorded every month up to one year. Young stock was physically measured once in six months. Measurements on adult animals were taken only once in the three years of study. The feeding and management of all marked animals was recorded once in three months. Milk recording were done once a month from the month of lactation by milking twice. Reproduction and disease aspects of these animals were also noted by observations and on the basis of information provided by the farmers. The total population of the Deoni breed was estimated by superimposing the population obtained by a survey on the Livestock Census Data already available with the State Department of Animal Husbandry. The breed descriptor was developed. The study was completed with the help of enumerators and supervisors.

Results and Discussion

General observations

The total number of households enumerated was 9 132. The average family size was about seven. The literacy percentage varied from 40 to 75 in the breeding tract. The average land holding was 8.5 acres out of which about 12 percent was irrigated and the remainder rainfed. The average herd size was 2.5 animals with a range of 1 to 16. About 30 percent of farmers were found rearing Deoni cattle.

Population statistics

Out of the 69 villages surveyed, 49 were in high-density areas whereas 20 others were in low-density areas, which were nearer to the borders of the breeding tract. The population of Deoni breed was 1.35 (Mulaj) to 58.58 percent (Deverjan) of total cattle

population in different strata. A total of 6 244 animals of this breed consisting of 541 calves (0-6 months), 783 calves (6-24 months), 328 calves (above 24 months), 1 212 females in milk, 719 females dry, 2 563 working males and 98 breeding males were found in the strata under survey. The total superimposed population of the Deoni in the entire breeding tract was estimated as 1 18 945 involving 5 014 from Parbhani, 97 002 from Latur, 14 882 from Nanded and 1 947 from the Osmanabad districts. The total superimposed population constituted approximately 39 977 (33.6 percent) breeding females, 1 784 (1.5 percent) breeding bulls and 48 827 (41.1 percent) working bullocks.

The Deoni cattle population enumerated from the villages at the initial stage (August 1996) was also compared to that enumerated after two years (August 1998). It was observed that the Deoni cattle population decreased by 8.78 percent during the period under study. This revealed that the Deoni

cattle population is decreasing continuously in the breeding tract and warrants urgent steps against its further decline.

Physical characteristics

Deoni is a medium heavy animal. It is found in three colour variations viz. Wannera, Balankya and Shevera. The body is moderately developed and symmetrical with distinct muscles. Males are more developed than females. Body colour is clear white in Wannera and Balankya strain. Irregular black spots are found on the body in Shevera. The head is partially white in Wannera. Head is masculine, alert, broad and slightly convex. The colour of the head is black and white in Wannera and Shevera and completely white in the Balankya strain. The forehead is prominent, broad, slightly bulged and white in all the strains; ears are long and drooping with slightly curved tips; horns are medium, thick, apart and emerge from the sides of the

Table 2. Production and reproduction characteristics in Deoni cattle.

S. No.	Characteristics	Records	Average \pm SE
1.	Milk yield in 1 st month (litres)	310	106.77 \pm 6.23
2.	Milk yield in 2 nd month (litres)	383	107.63 \pm 6.17
3.	Milk yield in 3 rd month (litres)	466	106.25 \pm 2.79
4.	Milk yield in 4 th month (litres)	516	101.83 \pm 5.76
5.	Milk yield in 5 th month (litres)	531	97.95 \pm 6.35
6.	Milk yield in 6 th month (litres)	573	88.20 \pm 6.75
7.	Milk yield in 7 th month (litres)	556	76.70 \pm 5.93
8.	Milk yield in 8 th month (litres)	523	59.27 \pm 6.51
9.	Milk yield in 9 th month (litres)	426	46.65 \pm 5.39
10.	Milk yield in 10 th month (litres)	329	33.23 \pm 5.45
11.	Milk yield in 11 th month (litres)	71	15.61 \pm 5.77
12.	Lactation Yield (litres)	597	868.24 \pm 49.56
13.	Average fat %	200	4.3 \pm 0.14
14.	Age at estrus (months)	1007	35.6 \pm 0.53
15.	Age at 1 st conception (months)	1007	36.6 \pm 0.54
16.	Age at 1 st calving (months)	1007	45.7 \pm 0.52
17.	Service period (days)	1007	170.0 \pm 7.0
18.	Inter-calving period (days)	1007	447.0 \pm 8.0
19.	Gestation length (days)	1007	277.0 \pm 1.0



Figure 4. A Deoni calf.

poles; tips of the horns are blunt; and eyes are prominent, bright and alert with black eyebrows.

The hump is massive and well developed in males and small in females. The neck is short, strong and well developed. Dewlap is thick, pendulous, and muscular with folds. It is more pendulous in males than in females. The chest is deep and wide. The skin of these animals is thick and loosely attached to the body. The tail is long reaching below the hock with black and white switch. The udder is well attached and medium in size with squarely placed black teats. Bulls are characterized by blackish scrotums of a good size. The animals are docile and calm.

Physical measurements

The linear measurements viz. height at withers, body length, chest girth, horn length, ear length and head length of all categories of Deoni cattle were recorded on 3 924 animals (Table 1). It was revealed that measurements increased with increase in age. The ear length in adult animals was similar in both sexes. The chest girth, body length and height at

withers were more in bulls than bullocks and milk/dry cows. Horn length, ear length, head length, chest girth, body length and height averaged 17.61, 26.18, 49.82, 151.82, 120.11 and 122.22 cm in cows and 19.97, 26.67, 53.68, 163.55, 129.59 and 134.36 cm in bullocks. Average chest girth, body length and height at wither in the present study were lower than that reported by Deshpande and Singh (1978). They reported 168.3 cm chest girth, 132.2 cm body length and 126.2 cm height at wither in adult cows in an organized herd.

Production and reproduction characteristics

The milk recording was carried out at monthly intervals in all the villages included in the project. The recording on 597 cows of different lactations was made. The milk consumed by the calf at the initial and last stage of milking was not included in the milk yield. The production and reproduction characters are shown in Table 2. Lactation milk yield averaged 868 litres. Milk yield was almost similar in first three months of lactation (106 to 107 litres) and declined

thereafter from the fourth month (102 litres) to the tenth month (33 litres). The average fat content in the milk of Deoni cows was 4.3 percent with a range of 2.5 to 5.3 percent. Cows showed their first oestrus at the average age of 36 months. Average age at first calving was 46 months. The service period and inter-calving period averaged 170 and 447 days. The average number of calvings per cow was six to seven. The selected bulls start breeding at the age of 30 months.

The production and reproduction performance of Deoni cattle in the present investigation was similar to that reported in the literature. Deshpande and Singh (1977A) observed lactation milk yield in Deoni herds ranging from 800 to 1 000 kg. Kakde *et al.* (1976) reported age at first calving in Deoni cows as 47 months. A service period of 184 days and calving interval of 466 days was reported in Deoni cows by Deshpande and Singh (1977B). Sontakke *et al.* (1978) reported average fat percent of 4.29 in 100 samples of Deoni cow milk.

Draught capacity

The observations were recorded on 25 pairs of bullocks at different locations. A bullock pair was able to pull the load of 10-11 quintals using wooden heavy cart with wooden wheels on katcha (muddy) road. They are able to pull a maximum of 28-30 quintals of load using a light steel bullock cart with tyre wheels on the tar roads for about 10-15 km. One pair of bullocks can pull the medium plough for about seven to eight hours a day and can plough about half an acre of land. The bullocks show their maximum potential at five to six years of age and maintain it up to 10-12 years of age.

Management practices

Deoni cattle are maintained under a semi-intensive system of management. They are traditionally reared on grazing in fallow lands, dry lands or bunds of the farms. The animals are allowed to graze from 8.00 a.m. to

5.00 p.m. The breeding bulls are usually stall fed. Only 12.7 percent of farmers grow green fodder (maize and sorghum). The animals are also provided with maize/sorghum stovers, paddy straw, wheat straw and sugarcane tops as well as groundnut, *urd* (*Vigna mungo*) and *arhar* (*Cajanus cajan*) haulms. The cows suckle their dams before and after milking. Quantity of the dry fodder mainly depends on availability of green fodder in the grazing areas. Some amount of concentrate is also given to the milking cows and working bullocks.

The animals are housed in either separate houses or part of the owner's residence during the night. About 50 percent of owners house their animals in open area, 3 percent keep their animals in *pucca* (cemented) houses and the remaining house their animals in *katcha* (muddy) house thatched with dry grass or sugarcane dry leaves. No weaning is practised in the breeding tract. The males are separated after 20 months of age and trained for agriculture operations. They are usually castrated at 30 months of age and used for transportation at three years of age.

Disease prevalence

The occurrence of foot-and-mouth disease was reported even after regular vaccination. Incidence of the other diseases like Rinderpest, Black Quarter, Coccidiosis, Mastitis and Pneumonia were also recorded. The calf and adult mortality was found to be negligible and the breed was found to be hardy and well adapted to tropical draught prone areas. Some cases of mastitis have also been reported by Deshmukh *et al.* (1995). Norladkar *et al.* (1994) reported occurrence of reproductive disorders in Deoni cows ranging from 2 to 4 percent.

Acknowledgement

The authors thank the Director, NBAGR, Karnal for guidance throughout the tenure of the study.

References

- Deshmukh, V.V., Markandeya, N.M. & Shastri, U.V.** 1995. Bovine mastitis caused by *B. cereus*. Indian Journal of Animal Research, 29: 62-63.
- Deshpande, K.S. & Singh, B.P.** 1977A. Genetic studies on Deoni cattle II. Lactation milk yield. Indian Veterinary Journal, 54: 727-31.
- Deshpande, K.S. & Singh, B.P.** 1977B. Genetic studies on Deoni cattle IV. Service period and calving interval. Indian Veterinary Journal, 54: 956-58.
- Deshpande, K.S. & Singh, B.P.** 1978. Genetic studies on Deoni cattle V. Body measurements. Indian Veterinary Journal, 55: 727-304-05.
- Kakde, P.V., Rotte, S.G., Deshpande, K.S. & Bonde, H.S.** 1976. Age at 1st calving and days open in Deoni cattle. Food Farming and Agriculture, 8: 26-28.
- Narladkar, B.W., Bakshi, S.A., Pargaonkar, D.R. & Digraskar, S.U.** 1994. Incidence of various reproductive disorders in Deoni cows and their crossbreds. Livestock Adviser, 19: 28-30.
- Sontakke, A.T., Ingle, U.M., Joglekar, V.V. & Bonde, H.S.** 1978. Studies on physico-chemical properties and quality of Deoni cow milk. Journal of Maharashtra Agricultural University, 3: 229-31.