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Present status and future prospects of Deoni Cattle

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ABSTRACT

Deoni cattle is one of the most important cattle breeds found in most drought prone region of the country i.e. Marathwada region of western India. In the present study, an attempt was made to explore this drought resistant breed for its genetic improvements and further research. Recently, the state animal husbandry department along with National Dairy Development Board of India has started registration of Deoni cattle in Information Network for Animal Productivity and Health (INAPH) for performance recording of this animal. It is found in three colour variations, viz. Wanera (clear white with black colour at both the sides of the face), Balankya (clear white colour body) and Shevera (white body with irregular black spots). The productive and reproductive traits of Deoni cows were studied by different workers and revealed that the average lactation milk yield varies from 238.86±76.0 kg to 868.24±49.56 kg, average lactation length varies from 149.43±33.52 days to 293.3±2.9 days, dry period varies from 103.66±19.78 days to 282.77±12.85 days, average daily milk yield ranges from 2.17±0.07 kg to 2.91±0.05 kg, the peak yield was observed to be 4.58 kg, age at first calving ranges from 1070.80±17.17 days to 1533 days, inter-calving period ranges from 447.0±8.0 days to 566.109±13.639 days and service period ranges from 152.14 ± 15.08 days to 286.57±13.38 days. It is imperative to conduct the genetic study on stress related genes like ATPA1, heat shock protein gene and disease resistance genes should be studied in Deoni cattle as it is predominantly found in drought prone region of the country. Due to non-availability of superior breeding bulls and increased homozygosity, this breed is suffering from problems of partial albinism.

Key words: Deoni breed, Marathwada, Performance

There are 40 recognized breeds of cattle in India, in addition to large number of non-descript population. These indigenous cattle are well known for better disease resistance; survive better in local environment, suitable for draught work and more suitable for low input management system. However, the major bottleneck is the low milk productivity of these animals which could be accelerated by genetic improvement. Improvement in production performance traits of indigenous breeds becomes essential to make them economically viable. Deoni cattle is dual purpose cattle breed and one of the most important dairy breeds in Maharashtra with an average standard milk yield of 868 kg with highest recorded 1,229 kg (NBAGR). Breed-wise survey (2013) revealed that the total Deoni population is 351,600 which comprises pure (151,236) and graded Deoni (20,364).

The native breeding tract of Deoni cattle is Latur district of Maharashtra and population is scattered throughout Beed, Osmanabad, Aurangabad and Parbhani districts. It is also found in adjoining states like Bidar region of Karnataka. Recently, the state animal husbandry department along with NDDB has started registration of Deoni cattle in Information Network for Animal Productivity and Health (INAPH) for performance recording of this animal.

This breed is named after Deoni taluka of Latur district. In order to protect and propagate this breed, the Maharashtra state animal husbandry department has introduced three pronged strategy which includes introduction of selected bulls in villages for natural service; supply of frozen semen of this breed for carrying out Artificial Inseminationing and involving Deoni Breeder's Association in conservation of Deoni breeds by conducting different awareness programs in the villages.

Physical and morphological characteristics viz. good milk yielders and draught animals, the Deoni is considered as an important dual-purpose breed of cattle (Fig. 1). It is claimed that it has been developed from a strain descended from a mixture of Gir, Dangi and local cattle (Dongarpatti). A contribution from the Gir type of cattle is quite evident in the formation of the head and ears, and also of the horns to a certain extent. They also show a great similarity in general conformation and ruggedness to the Dangi cattle

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Fig. 1. Deoni cattle male.

Fig. 2. Deoni strains Wanera, Balankya and Shevera.

which is not far from the Deoni cattle breeding area. The Deoni is a medium-sized animal which resembles the Gir in physical structure to a large extent. It is found in three colour variations, viz. Wanera (clear white with black colour at both the sides of the face), Balankya (clear white colour body) and Shevera (white body with irregular black spots) (Fig. 2). The body is moderately developed and symmetrical with distinct muscles (Singh *et al.* 2002).

Head is masculine, alert, broad and slightly convex. The colour of the head is black and white in Wanera 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 poll; 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 hair is soft and short. The cows have a fairly well-developed udder. The hooves are well-made and shapely and of a black colour. The body is massive and upstanding with considerable depth and gives an appearance of strength (Singh *et al.* 2006).

Population scenario: Deoni cattle are distributed throughout the state, however, the dense population is found in and around Latur district. Table 1 lists the pure Deoni population in Maharashtra as per DAHD (2013) while Table 2, reveals district wise population of Deoni cattle in Maharashtra.

Milk production of indigenous cattle in the region: Different systematic survey were conducted to determine geographic distribution, establish breed characteristics, determine socio-economic status and existing management practices as well as to estimate the approximate population of Deoni cattle in its breeding tract particularly in and around Latur district. Table 3 reveals the milk yield of indigenous cattle in the district in different years.

Production performance of Deoni cattle: The productive and reproductive traits of Deoni cows were studied by different workers and revealed that the average lactation milk yield varies from 238.86±76.0 kg (Chakravarthi *et al.* 2002) to 868.24±49.56 kg (Singh *et al*. 2002), average lactation length varies from 149.43±33.52 days (Chakravarthi *et al.* 2002) to 293.3±2.9 days (Deshpande and Singh 1977b), dry period varies from 103.66±19.78 days (Chakravarthi *et al*. 2002) to 282.77±12.85 days (Kumar *et al*. 2006), average daily milk yield ranges from 2.17±0.07 kg (Dhumal *et al.* 1993) to 2.91± 0.05 kg (Kumar *et al.* 2006), the peak yield was observed to be 4.58 kg (Deshpande and Singh, 1977a), age at first calving ranges from 1070.80±17.17 days (Chakravarthi *et al.* 2002) to 1533 days (Deshpande and Singh 1977c), inter-calving period ranges from 447.0±8.0 days (Singh *et al*. 2002) to 566.109±13.639 days (Thombre *et al*. 2001) and service period ranges from 152.14±15.08 days (Chakravarthi *et al.* 2002) to 286.57±13.38 days (Thombre *et al*. 2001). Deoni bullocks are good for heavy work and are particularly

Table 1. Pure Deoni population in Maharashtra (DAHD 2013)

Particular	Population		
Total Deoni male		30138	
Upto2 Years		8801	
Over 2 Years	Used for Breeding Only	572	21337
	Used for Draught Only	1271	
	Used for Draught & Breeding	19419	
	Others	75	
Total Deoni female		39177	
Under 1 Year		8509	
1 to 3 Years		5383	
Over 3 Years	In Milk	14780	25285
	Dry	8782	
	Not Calved Once	1673	
	Others	50	
Total Deoni cattle			69315

Table 2. District-wise population of Deoni Cattle in Maharashtra (2013-14)

District	Population (in thousands)	District	Population (in thousands)
Ahmadnagar	0.3	Jalgaon	0.3
Akola	0.1	Jalna	0.1
Amaravati	0.2	**Latur**	**52.6**
Aurangabad	3.4	Nashik	0.5
Nanded	0.3	Osmanabad	3.7
Beed	6.8	Parbhani	1.5
Buldhana	0.6	Pune	0.1
Chandrapur	0.2	Solapur	0.3
Dhule	0.2	Thane	0.2
Hingoli	0.2	Wardha	0.2

Source: Integrated Sample Survey Reports (1992-93 to 2013-14), Department of Animal Husbandry, Government of Maharashtra.

Table 3. Year wise indigenous cattle milk yield of Latur district

Year	Milk yield (kg/day)	Total milk yield ('000 MT)
1992-93	1.515	34.9
1997-98	1.779	32.8
2003-04	1.515	32.8
2007-08	1.573	29.4
2008-09	1.669	32.3
2009-10	1.773	36.9
2010-11	1.747	34.1
2011-12	1.807	35.4
2012-13	1.852	36.4
2013-14	1.475	29.3

Source: Integrated Sample Survey Reports (1992-93 to 2013-14), Department of Animal Husbandry, Government of Maharashtra.

suitable for intensive cultivation. A bullock pair was able to pull the load of 10–11 q using wooden heavy cart with wooden wheels on *kutcha* (muddy) road. They are able to pull a maximum of 28–30 q of load using a light steel bullock cart with tyre wheels on 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.

Traditionally, Deoni cattle are maintained under a semi-intensive system of management. They are usually reared by grazing in fallow lands, dry lands or bunds of the farms. The breeding bulls are usually stall fed. Very few 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 (*Vigno mungo*) and arhar (*Cajanus cajan*) haulms according to availability. The calves suckle their dams before and after milking. Quantity of the dry fodder fed depends mainly on the availability of green fodder in the grazing areas. Some amount of concentrate is also given to the milking cows and working bullocks.

Table 4. Production performance of Deoni cattle

Trait	Parameter	References
Lactation milk yield (kg)	818.1 (340) and 1041.9 (427)	Deshpande and Singh 1977a
	605±25.0 (171)	Dhumal *et al.* 1993
	518.223±22.44 (141)	Thombre *et al*. 2001
	868.24±49.56 (1212)	Singh *et al.* 2002
	238.86±76.00 (30)	Chakravarthi *et al.* 2002
	544.06±15.53 (163)	Kumar *et al*. 2006
Lactation length (days)	293.3±2.9 (770)	Deshpande and Singh 1977b
	277.0±9.23 (171)	Dhumal *et al.* 1993
	149.43±33.52 (30)	Chakravarthi *et al.* 2002
	185.79±4.35 (163)	Kumar *et al*. 2006
Average daily milk yield (kg)	2.17±0.07 (171)	Dhumal *et al.* 1993
	2.91±0.05 (163)	Kumar *et al*. 2006
Peak yield (kg)	4.37 (340) and 4.58 (427)	Deshpande and Singh 1977a
	2.28±0.24 (30)	Chakravarthi *et al.* 2002
Dry period (days)	177.0±4.2 (340)	Deshpande and Singh 1977b
	103.66±19.78 (30)	Chakravarthi *et al.* 2002
	282.77±12.85 (163)	Kumar *et al*. 2006
	256.87±7.34 (140)	Das *et al.* 2011
Age at first calving (days)	1533 (340)	Deshpande and Singh 1977c
	1451±36.45 (101)	Kakde *et al.* 1976
	1371 (1212)	Singh *et al.* 2002
	1070.80±17.17 (30)	Chakravarthi *et al.* 2002
Average fat per cent	4.3±0.14 (1212)	Singh *et al.* 2002
Inter-calving period (days)	566.109±13.639 (141)	Thombre *et al*. 2001
	447.0±8.0 (1212)	Singh *et al.* 2002
	452.55±19.88 (30)	Chakravarthi *et al.* 2002
	465.90±12.52 (163)	Kumar *et al*. 2006
	447.22±6.64 (140)	Das *et al.* 2011
Service period (days)	286.57±13.38 (141)	Thombre *et al*. 2001
	152.14±15.08 (30)	Chakravarthi *et al.* 2002
	170.0±7.0 (1212)	Singh *et al.* 2002

Figures in parenthesis indicates numbers of observations

The animals are housed in either separate houses or a part of the owner's residence during the night. No weaning is practiced 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 draught work at three years of age. The calf and adult mortality is negligible and the breed is hardy and well adapted to tropical drought-prone areas therefore their disease resistance genes needs to be studied.

Deoni cattle are being maintained at Cattle Breeding Farm, College of Veterinary and Animal Sciences, Udgir (MAFSU), Maharashtra; Deoni Cattle Breeding Farm, Gudgaripalli, Andhra Pradesh; Govt Farm, Kampasagar, Andhra Pradesh and Livestock Research and

Information Centre (Deoni), Hallikhed (B), KVAFSU, Bidar, Karnataka.

Molecular studies regarding polymorphism studies in various genes like lactoferrin gene (Singh *et al.* 2016), GSTP1 gene (Narasimha *et al.* 2013), Beta Casein gene (Ramesha *et al.* 2016) of Deoni cattle have been studied at NDRI Southern Regional Station.

Future prospects

To enhance the productivity of this priced cattle breed and to meet the need of genetically improved bulls' semen, it is required to produce genetically superior breeding bulls, the semen of which should be available at farmers' doorstep. For achieving genetic improvement in the existing Deoni cattle population, it is necessary to focus on following key areas:

1) Establishing database for performance recording of Deoni cattle; it is expected that Information Network in animal Productivity and Health (INAPH) has potential to become the National Database in near future.
2) Deoni cattle is predominantly found in drought prone region of the country, therefore, the genetic study on stress related genes and disease resistance genes should be studied as it was done in Rathi cattle of Rajasthan.
3) Due to non-availability of superior breeding bulls, the chances of inbreeding amongst the Deoni population could take place which results in expression of recessive genes like tyrosinase gene responsible for partial albinism (Schmutz *et al.* 2004).
4) Performance recording of maximum number of Deoni animals by registering in Database for identification and evaluation of genetically superior animals.
5) Establishing infrastructure for production and selection of genetically superior breeding bulls of Deoni breeds in the breeding tracts.
6) Strengthening the semen production facilities for production of disease free quality semen.
7) Increasing the number and percentage of animals bred through artificial insemination using semen of high genetic merit bulls of Deoni.
8) Large amount of non-discript cattle are present in the region, which should be upgraded with pure Deoni cattle.
9) Adequate numbers of semen doses of high genetic merit bulls should be supplied to the farmers' doorstep for genetic improvement.

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