

Original Research Article

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Study the Morphological Characteristics of Udder and Teat and Its Relation with Lactation Milk Yield in Deoni Cattle

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ABSTRACT

The research study was conducted during the year 2018-2019 on 256 Deoni cattle in 13 villages and Livestock Research & Information Centre (Deoni), Hallikhed (B) in Bidar district of Karnataka state. The study was carried out to find the morphological characteristics of udder and teat and its relation with lactation milk yield (LMY) in deoni cattle which was included in the project "Field Performance Recording of Deoni cattle in Bidar district" as part of Rashtriya Gokul Mission. The strain-wise and parity-wise various shapes of udder and teat were recorded. The finding of the study revealed that overall frequency percentage in shape of the udder was recorded viz; bowl shaped (49.61%), goaty shaped (14.06%), pendulous shaped (33.20%) and round shaped udder (3.12%), respectively. Whereas, overall frequency percentage in shape of the teat was recorded viz., bottle shaped (15.62 %), cylindrical (42.96 %), funnel (32.81%) and pear-shaped teats (8.60%). Similarly, Bowl shaped udder has highest LMY (1177.71 kg) followed by goaty (1134.88 kg), pendulous (1095.62 kg), while least LMY was recorded in round shaped udder (976.84 kg). However, cylindrical shape teat has highest LMY (1211.02 kg) followed by bottle (1102.42 kg), funnel (1063.64 kg) and least LMY was recorded in pear-shaped teat (1007.97 kg). The findings of the study over LMY were non-significant effect of udder and teat shape on lactation milk yield.

Keywords

Deoni cattle,
Lactation milk
yield,
Morphometric,
Shapes, Teat and
Udder

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Introduction

Milk yield is an important selection criterion in dairy cattle. Some anatomical attributes are considered related to milk production. The udder of the cow is one of the most important criteria used to predict production performance. A large sized udder with large

proportion of glandular tissue and a symmetrical shape is an asset to milch animals. The udder characteristics were reported to be important in relation to milk production, where production records were lacking (Akhtar and Thakuria 1998). Udder is the first site inspected while judging of dairy cattle by farmers for assessing the milking

ability of animals. Therefore, it is more important to have knowledge of morphology of udder and teat shapes and its relation with milk yield. Indian cattle breeds are described on the basis of colour, shape, body size, horn but very little information is available on udder characteristics. In India, systematic data on type and conformation of udder and teat are not available for different breeds. The size and shape of udder are very important conformation traits which could play a vital role for the suitability of economical milk production and should be considered for selecting dairy animals (Bhuiyan *et al.*, 2004). A roomy udder is a prerequisite for high milk production (Ahmed and Barbary 2000). Whereas, pendulous udders are more susceptible to injuries, mastitis and more difficult to milk through milking machine (Sagar *et al.*, 2009). It is presumed that the size and morphology of udder varies greatly from individual to individual animal and between different lactation orders (Bharti *et al.*, 2015). The size and form of udder and teats not only influence milk production, but also differ in their suitability for milking (Bardakcioglu *et al.*, 2011).

Materials and Methods

The research study was conducted during year 2018-2019 on 256 Deoni cattle in 13 villages and Livestock Research & Information Centre (Deoni) in Bidar district. The study was carried out to find the morphological characteristics of udder and teats and its relation with lactation milk yield in Deoni cattle, which was included in the project "Field Performance Recording of Deoni cattle in Bidar district" as part of Rashtriya Gokul Mission. The strain-wise and parity-wise various shapes of udder, teat and lactation milk yield were recorded. Shape of udder was determined through visual appraisal method adopted by Cerkascenko *et al.*, (1958) and accordingly categorized into different types, viz., Bowl, Goaty, Pendulous and Round.

Whereas, shape of teats was observed grossly and categorized into different types, viz., Bottle, Cylindrical, Funnel and Pear-shaped teats as per the visual appraisal method followed by Ovesen *et al.*, (1972). Statistical analysis was done using SAS software version 9.3 (2010) using General Linear Model (GLM) procedure.

Results and Discussion

Strain-wise and Parity-wise frequency of different udder shapes in Deoni cattle

In present study the observation regarding udder shape, found that bowl shaped udder was observed more predominant, followed by pendulous and goaty shaped udder. Whereas, round shaped udder was found least among all strain and parities of Deoni cattle. The overall frequencies of bowl (49.61%), goaty (14.06%), pendulous (33.20%) and round shaped udder (3.12%) were recorded respectively. The udder shape plays an important role in selection of high milk yielding cattle and the different shapes and size of the udder might be its genetic heritability (Liebenberg and Jannermann 1958). Similar findings were also reported by Kadam (2018) in Deoni cattle in Maharashtra with frequency of bowl-shaped udder being 52.25 per cent. However, the frequencies of the other udder shapes varied: pendulous (28.00%), goaty (2.75%) and round (17.00%). Similar study was conducted and reported in different breeds of the cattle by various researchers viz, Sharma 1967 reported that, high frequency of bowl-shaped udder was observed in Haryana (93%) and Tharparkar cows (70.9%) respectively. Similarly, findings are also confirmed by Tripathi *et al.*, (1982), Saiyed (1987), Prajapati *et al.*, (1995), Kamboj *et al.*, (2007), Danish *et al.*, (2018) and Manoj (2018). Contrary to the present study, Singh *et al.*, (1997) reported that high frequency of round shaped udder (72%) was observed in crossbred cow. However, in

Ongole cattle high frequency of goaty shaped udder (59.18%) was reported by Sampathkumar (2018). The strain-wise and parity-wise observed frequencies of various udder shapes are given in Table 1 & 2 respectively and shown in Figure 1.

Strain-wise and Parity-wise frequency of different teat shapes in Deoni cattle

In present study the observation regarding teat shape found that cylindrical shaped teat was observed more predominant, followed by funnel and bottle shaped teat. Whereas, pear shaped teat was found least among all strain and parities of Deoni cattle. The overall frequencies of Bottle (15.62%), Cylindrical (42.96%), Funnel (32.81%) and Pear-shaped teat (8.60%) were recorded respectively. The teat shape plays an important role in milk flow or let-down of milk from the udder, which also helps in selection of high milk yielding cattle and the different shapes of the teat might be its genetic heritability. Similar findings were reported by Kadam (2018) in Deoni cattle in Maharashtra with frequency of cylindrical shaped teat being 57.75 per cent. However, the frequencies of the other teat

shapes varied: bottle (2.25%), funnel (29.75%) and pear (10.75%) respectively. Similar study was conducted and reported comparable and high frequency of cylindrical shaped teatin different breeds of the cattle by various researchers viz., Tripathi *et al.*, (1982) reported that comparable frequency of cylindrical shaped teat (39 %) was observed in Gir cows, Saiyed (1987) as 83.73% in Jersey x Kankrej. Whereas, findings were also confirmed by Sampathkumar (2018) and Manoj (2018) in Ongole (57.82%) and Red Kandharicattle (43.50%), respectively. Contrary to the present study, Bhosrekar and Nagpaul (1971) reported that high frequency of funnel shaped teat (78.19%) in crossbred cows. However, Kamboj *et al.*, (2007) reported that funnel shaped teats were 48.27 % in Karan-Fries cows. Similar findings are also confirmed by Patel *et al.*, (2018) and Danish *et al.*, (2018) in crossbred (48.63%) and Sahiwal cows (58.82%) respectively. The observed strain-wise and parity-wise frequencies of different teat shapes in Deoni cattle are given in Table 3 & 4 respectively and shown in Figure 2.

Table.1.Strain-wise frequency of different udder shapes in Deoni cattle

Strain	Bowl	%	Goaty	%	Pendulous	%	Round	%	Total
Wannera	40	52.64	14	18.42	21	27.63	1	1.31	76
Shevera	68	50.38	14	10.37	48	35.55	5	3.70	135
Balankya	19	42.22	8	17.78	16	35.55	2	4.45	45
Overall	127	49.61	36	14.06	85	33.20	8	3.12	256

Table.2 Parity-wise frequency of different udder shapes in Deoni cattle

Parity	Bowl	%	Goaty	%	Pendulous	%	Round	%	Total
1	17	62.97	6	22.22	4	14.81	0	0	27
2	20	39.21	12	23.52	18	35.30	1	1.96	51
3	24	60.00	3	7.50	11	27.50	2	5.00	40
4	20	44.45	5	11.11	18	40.00	2	4.44	45
5	17	37.78	6	13.33	19	42.22	3	6.67	45
6	16	59.26	2	7.40	9	33.34	0	0.00	27
7	13	61.90	2	9.52	6	28.57	0	0.00	21
Overall	127	49.61	36	14.06	85	33.20	8	3.12	256

Table.3 Strain-wise frequency of different teat shapes in Deoni cattle

Strain	Bottle	%	Cylindrical	%	Funnel	%	Pear	%	Total
Wannera	9	11.84	35	46.05	27	35.52	5	6.58	76
Shevera	23	17.03	54	40.00	42	31.11	16	11.86	135
Balankya	8	17.78	21	46.66	15	33.33	1	2.23	45
Overall	40	15.62	110	42.96	84	32.81	22	8.60	256

Table.4 Parity-wise frequency of different teat shapes in Deoni cattle

Parity	Bottle	%	Cylindrical	%	Funnel	%	Pear	%	Total
1	1	3.70	8	29.63	11	40.74	7	25.92	27
2	9	17.64	21	41.18	18	35.29	3	5.88	51
3	8	20.00	15	37.50	10	25.00	7	17.50	40
4	7	15.55	20	44.44	18	40.00	0	0.00	45
5	8	17.78	19	42.22	14	31.11	4	8.89	45
6	5	18.52	13	48.15	8	29.62	1	3.70	27
7	2	9.52	14	66.66	5	23.80	0	0.00	21
Overall	40	15.62	110	42.96	84	32.81	22	8.60	256

Table.5 Udder shape-wise least square means of lactation milk yield (kg)

Udder Shapes	Lactation milk yield
Bowl	1177.71
Goaty	1134.88
Pendulous	1095.62
Round	976.84
Overall	1173.77 ± 33.868

Table.6 Teat shape-wise least square means of lactation milk yield (kg)

Teat Shapes	Lactation milk yield
Bottle	1102.42
Cylindrical	1211.02
Funnel	1063.64
Pear	1007.97
Overall	1173.77 ± 33.868

Fig.1 Different Shape of Udder

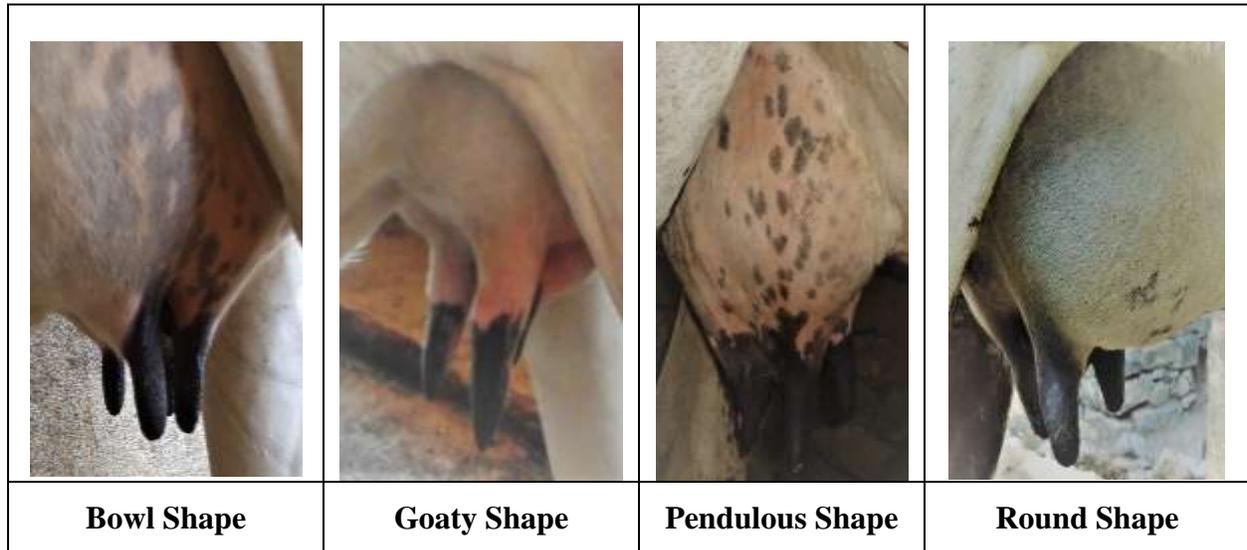
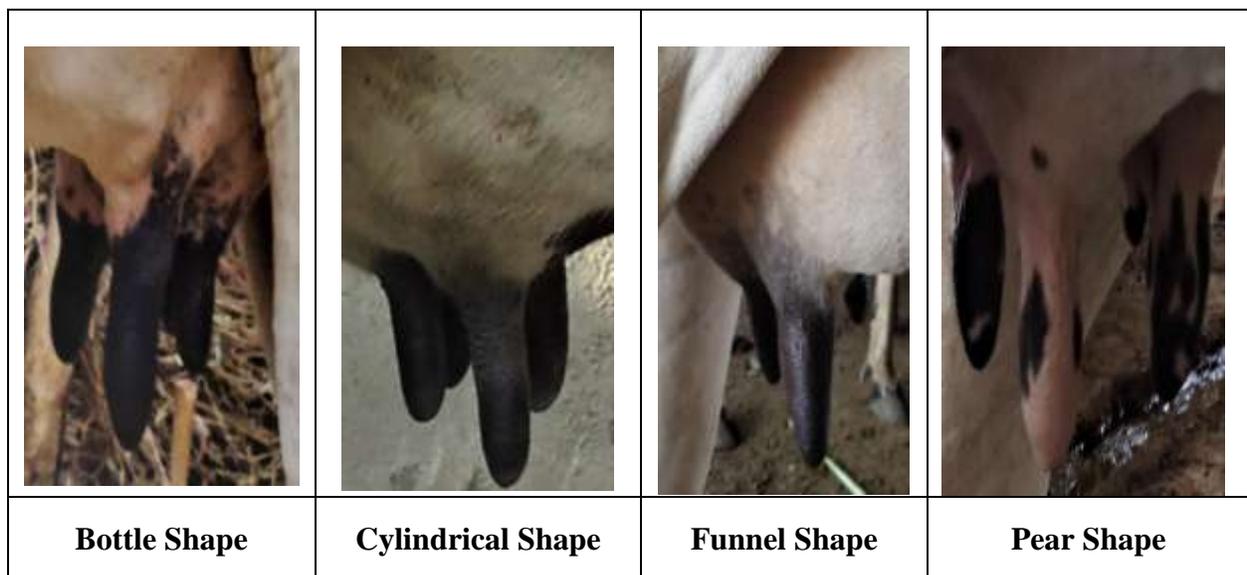


Fig.2 Different Shape of Teat



The udder and teat shape-wise lactation milk yield (LMY) in Deoni cattle

In present study the regarding lactation milk yield (LMY) in Deoni cattle observed that, Bowl shaped udder has highest LMY (1177.71 kg) followed by goaty (1134.88 kg) and pendulous shaped udder (1095.62 kg), while least LMY was recorded in round

shaped udder (976.84 kg). However, cylindrical shape teat has highest LMY (1211.02 kg) followed by bottle (1102.42 kg), funnel (1063.64 kg) and least LMY was recorded in pear- shaped teat (1007.97 kg). The findings of the study over LMY were non-significant effect of udder and teat shape on lactation milk yield. In present study overall lactation milk yield was found to be

1173.77 ± 33.868 kg. Comparable LMY (1193.22 ± 44.79 kg) in Deoni cattle was reported by Gatchearle *et al.*, (2009). Similarly, Das *et al.*, (2012) (911.14 kg), Kuralkar *et al.*, (2014) (910.95±27.62 kg), Patil (2014) (881.35±37.64 kg), Saravanan *et al.*, (2015) (824.44±149.99 kg) and Basak and Das (2018) (819.98 ± 16.50 kg). However, lower LMY in Deoni cattle reported by Thombre *et al.*, (2001) (518.23 ± 22.44 kg), Chakravarthi *et al.*, (2002) (238.86 ± 76.00 kg), Bhutkar *et al.*, (2014) (358.31±27.18kg) and Shingare *et al.*, (2015) (236.43 ± 12.71 kg). The udder and teat shape-wise lactation milk yield of Deoni cattle is given in Table 5 and 6, respectively.

In conclusion, Bowl shaped udders were the predominant shape in Deoni cattle and other cattle breeds. Pendulous udders were more common in fourth and fifth parities, which could be explained by the loosening of udder ligaments with age. A pendulous udder with poorly spaced teats is thick, prone to ballooning and could result in poor suckling and possibly increased calf mortality. Cylindrical shaped teats were the predominant shape in Deoni cattle and other cattle breeds and common in sixth and seventh parities. The uneven shaped teats will cause calf suckling problems and mortalities. Poor teat shape and texture leads to injury causing scar tissue and reduced milk flow. Bowl shaped udder and cylindrical shape teat has highest LMY. Therefore, impact of udder and teat shape is very important criteria for selection of high milk yielding Deoni cattle.

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