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UDDER AND TEAT MEASUREMENTS AND THEIR RELATION WITH MILK PRODUCTION IN CROSSBRED COWS

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Abstract: The present investigation was conducted on the milking herd of crossbred cows and the following conclusions were derived: The average length, width and depth of udder were 58.24 ± 0.68 cm, 65.45 ± 0.70 cm, 23.06 ± 0.34 cm, respectively. All the measurements were found to increase in lactation number. The average length of fore teats was found to be non-significantly longer than rear teats (6.07 cm VS 5.39 cm). The correlations between milk yield and various udder measurements viz., udder length (0.499), udder width (0.413) and udder depth (0.178) were found positive and significant. ($P<0.05$) to highly significant ($P<0.01$).

Keywords: Udder, Teat, Length, Width, Depth, Milk Production.

Introduction

The production records of most of the animals, particularly in villages, are not available. Therefore, in selecting economical to the uneconomical cow, it becomes essential to have some idea about the production capacity of udder. India has witnessed white revolution attributed to its manifold increase in milk production during seventies. Milk production in the country has increased by many folds during post-independent era from 17 million tons during 1951 to 132.43 million tons during 2012-2013. The incidences of subclinical mastitis are higher in cows as compared to buffaloes [13] and among cows in crossbred cows due to rapid removal of large amount of milk which causes injury to teats and predisposing to infection [9]. Udder is the first site judgment of local brokers or animal husbandry men in our country for judging the milking ability of animals. So it is more important to have knowledge of morphology of udder and teats and its relation with the mastitis within this subclinical mastitis.

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Material and Methods

The data for the present study were collected from the milking crossbred cows. The following observations were made on 200 crossbred cows (1) udder length, (2) udder width, (3) udder depth, (4) teat length, (5) teat diameter, (6) test day milk yield

The udder length was measured from the rear attachment of the udder, near the escutcheon, to the front of the udder where it blends smoothly with the body. The udder width was measured as a distance between two lateral lines of attachment of the udder to abdominal wall, beneath the flank. The measuring tape was kept in position on one side of the cow, under flank, near the stifle joint and it was passed over in between fore and rear teats to the other side. The udder depth was measured by subtracting distance from the barn floor to the udder floor from distance from the barn floor to the base of the udder.

Teat length was measured from the upper part of the teat, where it hangs perpendicularly from the quarter to the tip. Teat length was measured to the nearest 0.01 cm using Vernier Caliper. Teat diameter was measured at the mid- point length by Vernier Caliper to the nearest 0.01 cm. All four teats were measured individually and average length was worked out.

All the measurements were taken one to two hours before the evening milking after securing the animals properly in a standing position on a leveled pucca floor for the accuracy. All the measurements were recorded in centimeters. Statistical analysis was done using standard procedures [12].

Results and Discussion

The mean and standard error values of udder length, width and depth in different parities ranged from 54.93 ± 1.21 to 62.56 ± 2.23 cm, 60.69 ± 1.22 to 69.32 ±2.14 cm and 20.87 ± 0.50 to 26.58 ± 1.05 cm, respectively (Table 1). Perusal of data showed a gradual increase in length, width and depth of the udder as the number of parity increases except for the udder length which showed a decline in 4th parity and then again has increased in 5th parity. Ghosh and Prasad [3] and Prasad *et al.* [7] also found a decline in udder length in 4th parity of Jersey × Red Sindhi and Murrah buffaloes, respectively. Results indicated that multiparous cows had a significant ($P<0.05$) larger volume of udder than the primiparous cows. The differences observed in udder length, width and depth in different parities were statistically significant ($P<0.05$). Similar findings were reported for Vrindavani cattle [11].

The mean values along with standard error of various teat measurements of crossbred cows in different parities are shown in Table 2. Mean fore teat length and rear teat length of crossbred

cows in different parities ranged from 5.48 ± 0.76 to 6.52 ± 0.34 cm and 4.92 ± 0.68 to 5.94 ± 0.32 cm, respectively. Perusal of data showed a gradual increase in length of fore and rear teat with advancement of the parity except for the fore teat length which showed a decline in 3th parity and then again has increased. The differences observed in fore teat length and rear teat length in different parities were statistically significant (P<0.05). Similar results were observed in Holstein crossbred cows [5] wherein fore teat length has increased with the advancement in parity. Present finding is in conformity with the study of Vrindavani cattle [11] in which significant (P<0.05) increasing trend in teat length with increase in parity. Significant (P<0.05) to highly significant (P<0.01) effect of parity on teat length have been observed in Hariana cows, Tharparkar cows, Kankrej cows, Murrah buffaloes and Gir cows by earlier workers ([10],[6],[7] and [16]).

Correlation coefficients observed between various udder and teat measurements and test day milk yield are shown in table 3. Highly significant (P<0.01) and positive correlations were observed among the udder measurements viz., udder length, udder width and udder depth. This indicates that all three udder measurements were closely inter-related. Similar results were observed in Gir cows [14], Jersey × Kankrej F1 cows [8], Sahiwal cows [1] and in Gir cows [16].

Similarly, positive and significant (P<0.05) to highly significant (P<0.01) association of udder width and udder depth with average fore teat length, rear teat length, fore teat diameter, rear teat diameter overall teat length and overall teat diameter were observed. However, udder length was significantly (P<0.05) correlated only with teat diameter traits i.e., fore teat diameter, rear teat diameter and overall teat diameter. Significant (P<0.05) association of udder length, udder width and udder depth with overall teat length and overall teat diameter were reported in Gir cows [16].

The correlations observed between various teat measurements viz., fore teat length, rear teat length, fore teat diameter and rear teat diameter were also positive and significant (P<0.05) to highly significant (P<0.01). Significant (P<0.05) correlation was also reported between the teat length and teat diameter [14].

The correlations between milk yield and various udder measurements viz., udder length (0.499), udder width (0.413) and udder depth (0.178) were found positive and significant (P<0.05) to highly significant (P<0.01). These findings reflected that all the three udder measurements should be the important criteria for selection of dairy cows as the udder length, width and depth decides the capacity of udder which reflects the milk yield. Ghosh and

Prasad [3] also found a positive and significant (P<0.01) association between udder length, width and depth with test day milk yield in Jersey × Red Sindhi crossbred cows. Strong correlation of milk yield with udder length (0.49), width (0.44) and depth (0.52) in Holdeo crossbred cows [15]. Similar findings has been reported in Vrindavani cattle [11]. Significant (P<0.05) correlation of udder length (0.64) with milk yield in Kenana × Friesian crossbred cows [2].

In present study, all the teat measurements showed a non-significant relation with milk yield except the fore teat diameter which had positive and significant (P<0.05) association with milk yield. Gupta *et al.* [4] while working on Karan-fries cows, reported that all four teats diameter were almost same and the correlation coefficient of teat length and diameter with milk production were not encouraging.

References

[1] Ahlawat, Kuldeep, Dang, A.K. and Singh, Charan (2008). Relationship of teat and udder shape with milk SCC in primiparous and multiparous Sahiwal cows. *Indain Journal of Dairy Science*, **61(2)**:152-156.

[2] Deng, M.P., Badri, T.M., Atta, M. and Hamad, M.E. (2012). Relationship betweenudder dimensions and milk yield of Kenana × Friesian crossbred cows. *Research Opinions in Animal & Veterinary Science*, **2(1)**:49-54.

[3] Ghosh, B. and Prasad, J. (1998). Milk yield and composition as influenced by udder measurements, in Jersey × Red Sindhi crosses. *Indian Journal of Animal Production & Management*, **14(1)**:23-25.

[4] Gupta, R., Singh, R.P. and Tomar, S.S. (1991). Udder and Teat measurement and their association with milk production in Karan-Fries cows. *Indian Journal of Animal Research*, **25(1)**:23-28.

[5] Kuczaj, Marian (2003). Analysis of changes in udder size of high-yielding cows in subsequent lactations with regards to mastitis. *Electronic Journal of Polish Agricultural Universities Animal Husbandry*, **6(1)**:1-8.

[6] Prajapati, K.B., Ashwar, J.P., Patel, J.P., Patel J.B. and Singh, D.V. (1995). Size and shape of udder and teats in Kankrej cows. *Indian Journal of Animal Production & Management*,, **11(1):**43-48.

[7] Prasad, R.M.V., Raghava Rao, E., Sudhakar, K., Ramesh Gupta, B. and Mahender M. (2010). Studies on udder and teat measurements as affected by parity and their relationship with milk yield in Murrah buffaloes. *Buffalo Bulletin*, **29(3)**:194-198.

[8] Saiyed, L.H. (1987). Biometrics of certain body parts in relation to body weight and milk production in Jersey × Kankrej crossbreds. M. V. Sc. Thesis submitted to Gujarat Agricultural University. Anand.

[9] Shahid, M. Sabir, N., Ahmed, I., Khan, R.W., Irshad, M., Rizwan, M., Ahmed, S.(2011). Diagnosis of subclinical mastitis in bovine using conventional methods and electronic detector. *ARPN Journal of Agriculture and Biological Science*, **6(11)**:18-22.

[10] Sharma, B.D., Singh, C.S.P. and Singh D.K. (1983). Variation in udder biometrics of Tharparkar and Hariana cows. *Indian Journal of Dairy Science*, **36(3)**:272-276.

[11] Singh, Rana Ranjeet, Dutt Triveni, Singh, Mukesh and Amit Kumar. (2010).Association of udder and teat dimensions with production traits in Vrindavani cattle. *Indian Journal of Dairy Science*, **63(6)**:455-458.

[12] Snedecor, G.W. and Cochran, W.G. (1994). Statistical methods (7th ed). Iowa State Uni, Press, Iowa.

[13] Thapa, B. B. and Kaphle, K. (2002). Selecting different drug combinations for thecontrol of bovine clinical mastitis. *Journal of Animal and Veterinary Advances*,**1**: 18-21.

[14] Tripathi, G.S., Koul, G.L. and Katpatal, B.G. (1982). Biometrical studies on shapeand size of udder and teats and their relation with milk yield in Gir cattle. *Indian Journal of Dairy Science*, **35(4)**:539-543.

[15] Waghmore, Prashant and Siddiqui, M.F. (2000). Studies on correlation of differentudder and teat measurements with lactation milk yield in case of Holde crossbred cows. *Karnataka Journal of Agricultural Science*, **13 (3)**:802-804.

[16] Singhai, S.K., Ravikala K., Murthy, K.S., Gajbhiye, P.U., Vataliya, P.H. and Savsani, H.H. (2013). Udder teat morphology and body measurements and their relationship with milk yield and milking traits in Gir cows. *Indian Journal of Animal Production and Management.* **29**(1-2):5-11.

Table 1: Udder measurements of Crossbred cows in different parities

Parity	N	Udder Measurements (cm)					
		Udder length		Udder width		Udder depth	
		Mean ±S. E.	C. V. %	Mean ± S. E.	C. V. %	Mean ± S. E.	C. V. %
1	52	54.93^{a} ± 1.21	15.82	60.69^{a} ± 1.22	14.48	20.87^{a} ± 0.50	17.32
2	40	57.24^{ab} ± 1.22	13.45	64.78^{ab} ± 1.43	14.00	22.34^{ab} ± 0.94	26.75
3	45	60.29^{bc} ± 1.54	17.15	67.30^{bc} ± 1.35	13.45	23.67^{b} ± 0.54	16.33
4	37	58.62^{abc} ± 1.51	15.70	68.62^{bc} ± 1.68	14.90	23.94^{b} ± 0.65	16.53
≥ 5	26	62.56^{c} ± 2.23	18.18	69.32^{c} ± 2.14	15.74	26.58^{c} ± 1.05	20.11
Overall	**200**	**58.24 ± 0.68**	**16.54**	**65.45 ± 0.70**	**15.15**	**23.06 ± 0.34**	**20.90**

Means with different superscripts in columns differ significantly (P< 0.05)

Table 2: Teat measurements of Crossbred cows in different parity

Parity	n	FTL (cm)		RTL (cm)		FTD (cm)		RTD (cm)	
		Mean ± S. E.	C. V. %	Mean ± S. E.	C. V. %	Mean ± S. E.	C. V. %	Mean ± S. E.	C. V. %
1	52	5.48^{a} ±0.76	20.79	4.92^{a} ± 0.68	21.82	2.67 ± 0.37	27.78	2.51 ± 0.35	28.08
2	40	6.21^{b} ± 0.32	32.62	5.21^{ab} ± 0.23	27.60	2.74 ± 0.11	26.43	2.66 ± 0.09	21.69
3	45	6.07^{ab} ± 0.21	23.34	5.46^{abc} ± 0.21	25.57	2.73 ± 0.08	20.52	2.68 ± 0.10	24.57
4	37	6.46^{b} ± 0.22	20.28	5.79^{bc} ± 0.21	22.44	2.71 ± 0.11	24.18	2.62 ± 0.66	25.17
≥ 5	26	6.52^{b} ± 0.34	26.21	5.94^{c} ± 0.32	27.62	2.76 ± 0.13	23.16	2.82 ± 0.14	25.15
Overall	**200**	**6.07 ± 0.05**	**25.55**	**5.39 ± 0.05**	**25.62**	**2.72 ± 0.02**	**24.50**	**2.64 ± 0.02**	**25.11**

Means with different superscripts in columns differ significantly (P< 0.05)

Table 3: Correlation coefficients between various udder and teat measurements and test day milk yield in crossbred cows

	MY	UL	UW	UD	FTL	RTL	FTD	RTD	AV. TL	AV. TD
MY										
UL	0.499**									
UW	0.413**	0.697**								
UD	0.178*	0.526**	0.685**							
FTL	-0.025	0.081	0.208**	0.160*						
RTL	-0.0002	0.112	0.229**	0.164*	0.780**					
FTD	0.153*	0.182**	0.176*	0.163*	0.412**	0.351**				
RTD	0.127	0.141*	0.196**	0.139*	0.323**	0.401**	0.748**			
AV. TL	0.027	0.125	0.353**	0.285**	0.641**	0.636**	0.230**	0.203**		
AV. TD	0.128	0.232**	0.313**	0.267**	0.134	0.196**	0.638**	0.653**	0.421**	

* $P < 0.05$, ** $P < 0.01$