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RELATIONSHIP AMONG VARIOUS UDDER AND TEAT MEASUREMENTS AND TEST DAY MILK YIELD

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Abstract: Significant (P<0.01) and positive correlations were observed among the udder measurements viz., udder length, udder width and udder depth. This indicated that all three udder measurements were closely inter-related. The correlations observed among 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). The correlations between various udder measurements viz., udder length (0.499), udder width (0.413) and udder depth (0.178) and milk yield were positive and significant (P<0.05) to highly significant (P<0.01). 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.

Keywords: Udder, Teat, Test Day, Milk Yield.

Introduction

Livestock sector plays an important role in the national economy and social economic development of the country. 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 165.4 million tons during 2016-2017. Physical characteristics of udder and teats are important traits associated with incidences of sub-clinical mastitis (Sabin George *et al.,* 2007). Under Indian condition for judging or prediction of milk production capacity of dairy animals at many places udder is the first site judgment of local brokers or animal husbandry men till date. From the development of the udder some can predict the milk yield of particular cow and buffaloes but not much research was done on the udder and teat morphology and their influence on the milk yield in crossbred cows. Hence, an attempt was made to study the morphological variations in udder and teat shapes and dimensions and their relation with milk yield in crossbred cows.

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Material and Methods

Biometry of udder (length, width and depth)

Udder length, width and depth were measured one to two hours before the evening milking after acquiring the animals properly in a standing position on a leveled pucca floor for the accuracy. All the measurements were recorded in centimeters.

a. Udder length: 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.

b. Udder width: 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.

c. Udder depth: The udder depth was measured by deducting distance from the barn floor to the udder floor from distance from the barn floor to the base of the udder.

Biometry of teat (length and diameter)

Teat length and diameter were measured one to two hours before evening milking after securing the animals properly in a standing position on a leveled pucca floor for the precision measurement. All the measurements were recorded in centimeters.

a. ***Teat length:*** Teat length was measured form 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. All four teats were measured individually and average length was worked out.

b. ***Teat diameter:*** 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 diameter was worked out.

On a day of udder and teat measurements, the evening milk yield of the cows was recorded and morning milk yield was added into that after asking the farmer to arrive at test day milk yield.

Result and Discussion

Correlation coefficients observed between various udder and teat measurements and test day milk yield are shown in table 1. Significant ($P<0.01$) and positive correlations were observed among the udder measurement traits viz., udder length and udder width (0.697), udder width and udder depth (0.685) and udder length and udder depth (0.526). This indicates that all three udder measurements were closely inter-related. Similar results were observed by

Tripathi *et al.,* (1982) in Gir cows, Saiyed (1987) in Jersey × Kankrej F1 cows, Ahlawat *et al.* (2008) in Sahiwal cows and Singhai *et al.* (2013) in Gir cows.

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. Singhai *et al.* (2013) reported significant (P<0.05) association of udder length, udder width and udder depth with overall teat length and overall teat diameter in Gir cows.

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). Tripathi *et al.*(1982) reported significant (P<0.05) correlation between the teat length and teat diameter.

The correlations of various udder measurements viz., udder length (0.499), udder width (0.413) and udder depth (0.178) with milk yield 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 (1998) 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. Waghmore and Siddiqui (2000) reported strong correlation of udder length (0.49), width (0.44) and depth (0.52) with milk yield in Holdeo crossbred cows. Similar findings were reported in Vrindavani cattle by Singh *et al.* (2010). Deng *et al.* (2012) also reported significant (P<0.05) correlation of udder length (0.64) with milk yield in Friesian × Kenana crossbred cows. 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.*(1991) while working on Karan-Fries cows, reported that all four teats diameters were almost same and the correlations coefficient of teat length and diameter with milk production were not encouraging.

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	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**	

Table 1: Correlation coefficients between various udder and teat measurements and test day milk yield in crossbred cows