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Importance of Teat Characteristics in Selecting Cross-Bred Dairy Cows on Milk Yield at the Villages of Tangail in Bangladesh

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Abstract: *This study was conducted to find out the importance of various characteristics of teat and to study their relationship with milk yield in crossbred dairy cows. By a previously prepared module, 100 crossbred dairy cows were selected to collection of data for the various measurements and shapes of teat from the 3 villages named Fulbari, Koira and Bhatkura of Dhanbari upazila at Tangail District in Bangladesh. The phenotypic correlation coefficients between teat measurements and test milk yield and between all possible combinations of teat measurements were significant (P<0.01), including that length and diameter of teat were related to each other and also to the milk production. A cylindrical shaped teat having middle teat length with highest milk production was found as an asset for a milch cow. It may be concluded that a well characteristics of teat is to be considered of teat is to be considered for selecting dairy cows on milk yield.*

Key words: *Importance, teat characteristics, cross-bred dairy cows, milk yield*

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I. Introduction

Livestock is a vital component of agriculture and contributing about 3.10% to gross domestic products (GDP) and this is also contributing more than 6% of total foreign exchange earnings in Bangladesh (BER, 2015). Per capita meat and milk requirement are 120 gm/day and 250 ml/day, respectively but in Bangladesh, per capita availability of meat and milk are 102 gm/day and 120 ml/day, respectively (BER, 2013), while, here in Bangladesh annual production of milk is 3.46 million tons only but total annual requirement is 13.32 million tons (MT) of milk (BER, 2012).

The mammary system (popularly known as udder) of the cow is a most important physical asset. A large, strongly attached, well-carried, quality udder with suitable teats is very important for heavy milk production and a long period of usefulness. Size and shape of teat are important to decide the susceptibility of udder to milk yield. Moreover, these characters are believed to be associated with mastitis and milking machine. Several studies (Abdullah et al., 2013; Bardakcioglu et al., 2011; Bosselli et al., 2010; Singh et al., 2010; Rahman and Gill, 1986) have provided documented evidence for such hypothesis. But it very unfortunate that very few works have been conducted in Bangladesh in favour of this important issue. So the present work was undertaken to measure the shape and size of teat of cross-bred dairy cows and also to find out the relationship of teat characteristics on milk yield of our cross-bred dairy cows.

II. Materials and Methods

The present research work was carried out during the period of January-February, 2020. In order to achieve the objectives of the study, a total of 100 cross-bred dairy cows were selected from 3 villages named Fulbari, Koira and Bhatkura of Dhanbari upazila at Tangail District in Bangladesh. The following parameters such as milk yield (kg/day), length and diameter of teat (cm), distance between teats (cm) and shape of teat were measured from each cow during the study period.

The above mentioned information were collected by researcher himself. It was found that most of the cross-bred cows were milked twice a day, morning and evening. So, morning and evening milk yield was combined together to get the milk yield of a cow for that day.

'Teat length' was measured by using a vernier calipers on base of the teat. 'Teat diameter' was measured by using a vernier calipers on base of the teat. On the other hand, 'distance between teats' was

measured by lightly placing 15x11 cm sheet of coarse plastic paper in contact with tips of the teats immediately after milking with spraying colouring water on teats by a syringe.

A visual appraisal was made to evaluate the shape of teat. The teats were classified into cylindrical, bottle and funnel shaped by adopting the description of Ovesen (1972). Statistical analysis such as percent, mean, standard error, coefficient of variation, correlation coefficient were done to get clean picture from the collected data.

III. Results and Discussion

The mean values along with standard error (S.E.) and coefficient of variation (C.V.%) of different teat measurements in cross-bred dairy cows are presented table 1. The average length of fore teats was 5.539±0.150 cm with a C.V. of 27.00% and that of rear teats was 4.842±0.121 cm with C.V. of 25.00%. Fore teats, thus, were longer than rear teats. Similar findings have been reported by Bardakcioglu et al., (2011) in Red Sindhi and Sahiwal cattle.

Table no 1: Mean, standard error (S.E.) and coefficient of variation (C.V.%) of different teat measurements in cross-bred dairy cows

Traits	Mean (cm)	S.E.	C.V. %
Teat length (fore teat)	5.539	±0.150	27.00
Teat length (rear teat)	4.842	±0.121	25.00
Teat diameter (fore teat)	2.256	±0.060	26.81
Teat diameter (rear teat)	2.043	±0.048	23.65

Table no 2: Mean, standard error (S.E) and coefficient of variation (C.V.%) of distance between teats

Distance between teats	Mean (cm)	S.E.	C.V. %
Fore teat to fore teat	5.71	±0.16	27.68
Rear teat to rear teat	2.89	±0.09	30.49
Right teat to right teat	4.26	±0.10	23.41
Left teat to left teat	4.26	±0.10	22.70
Diagonals (FrXRl)	5.63	±0.10	17.93
Diagonals (RlxRr)	5.66	±0.13	23.26

Mean, standard error (S.E.) and coefficient variation (C.V.%) of distance between teats in cross-bred dairy cows in the present study have been presented in table 2. The distance between fore, rear, right and left teats were found 5.71±0.16 cm, 2,89±0.09 cm and 4.26±0.10 cm and 4.26±0.10 cm respectively. The distance fore teats (5.71±0.16 cm) was higher than the distance between rear teats (2.89±0.09 cm). The result of the present study is supported by the findings of Bardakcioglu et al. (2011). Distance of diagonals (Fr x Rl) and distance of diagonals (Fl x Rr) were 5.63±0.10 cm and 5.66±0.13 cm respectively. Of these measurements, the distance of diagonals (Fr x Rl)(17.93%) had the lowest C.V. whereas it was highest for the distance between rear teats (30.49%). Ulusan (1996) reported similar findings of Simmental and Brown cows at the Kars State Breeding Station.

Table no 3: Phenotypic correlation coefficient among various traits

	Teat diameter	Test milk yield
Teat length-Font	0.809±0.059**	0.525±0.086**
Rear	0.740±0.068**	0.521±0.086**
Teat diameter-Font		0.477±0.089**
Rear		0.559±0.084**

** Significant at 1% level

A phenotypic correlation coefficient between test milk yield and different teat measurement traits in crossbred dairy cows is calculated and presented in the table 3. Teat length of fore and rear teat measurements (0.525±0.086 and 0.521±0.086 respectively) was significantly correlated (P<0.01) with test milk yield. Teat length of fore and rear teat measurements (0.809±0.059 and 0.740±0.068 respectively) was also correlated (P<0.01) with teat diameter of fore and rear teat measurements. Similarly, teat diameter of fore and rear teat measurements (0.477±0.089 and 0.559±0.084 respectively) was correlated with test milk yield. These correlations are comparable with those reported for Gir cows (Qureshi et al. 1984).

Table no 4: Different types of teats and their percent frequency distribution in crossbred dairy cows

Types of teats	Fore teats		Rear teats	
	No. of observations	Frequency (%)	No. of observations	Frequency (%)
Cylindrical	61	61	58	58
Funnel	22	22	29	29
Bottle	17	17	13	13

Table no 5: Least-squares means and their standard error (S.E.) of teat measurement traits in crossbred dairy cows along with milk yield

Teat shape	Teat length (cm)					Teat diameter (cm)					Avg. *TMY (kg)
	Obs.	Front	Obs.	Rear	Avg.	Obs.	Front	Obs.	Rear	Avg.	
Cylindrical	61	5.57±0.19	58	4.99±0.17	5.29±0.13	61	2.22±0.07	58	2.01±0.06	2.12±0.05	3.10±0.14
Funnel	22	5.20±0.33	29	4.49±0.21	4.80±0.19	22	2.27±0.14	29	2.15±0.10	2.21±0.08	2.79±0.16
Bottle	17	5.84±0.34	13	4.97±0.22	5.46±0.23	17	2.37±0.19	13	1.95±0.13	2.19±0.13	2.89±0.19
Overall	100	5.54±0.15	100	4.84±0.12	5.19±0.10	100	2.26±0.06	100	2.04±0.05	2.15±0.04	2.99±0.13
C.V%		27.00		25.00	27.00		26.81		23.65	25.89	45.01

*means test milk yield

Different types of teats in cross-bred dairy cows were also studied and their frequencies are presented in table 4. Cylindrical type of fore teats are found to be in higher frequency (61%) followed by funnel (22%) and bottle shaped (17%) and in case of rear teats, cylindrical type of teats are also found to be in higher frequency (58%) followed by funnel (29%) and bottle shaped (13%) in present study. This is agreement with the findings of Qureshi et al. (1984).

The dimensions of different shaped teat are presented in table 5. The length and diameter of front teats had higher than rear teats in all types of teat. Bottle-shaped teats had highest values (5.46±0.23 cm) for teat length followed by cylindrical (5.29±0.13 cm) and funnel-shaped (4.80±0.19 cm) teats. However, funnel-shaped teats had highest values (2.21±0.08 cm) for teat diameter followed by cylindrical (2.12±0.05) cm) and bottle-shaped (2.19±0.13 cm) teats; but lowest values (4.80±0.19 cm) for teat length with other shapes. Teat measurement was less variable (23.65 to 27.00 percent C.V.) than test milk yield (45.01 percent C.V.). Test milk yield (3.10±0.14 kg) was highest for cylindrical-shaped teats with lowest teat diameter (2.12±0.05 cm) and middle teat length (5.29±0.13 cm) measurement. Similar finding was also noticed by Moore et al. (1981) in Holstein cows. From the above discussion it is clear that size and shape of teat are very important conformation traits which could play a vital role for the suitability of milking and economical milk production. So, everyone who works with or studies the characteristics of milking cows is suggested to consider the above information about the teat characteristics for selecting cross-bred dairy cows on milk yield.

IV. Conclusion

A cylindrical shaped teat having middle teat length with highest milk production was found as an asset for a milch cow. It may be concluded that a well characteristics of teat is to be considered for selecting dairy cows on milk yield.

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