GROSS MORPHOMETRIC MEASUREMENTS OF UDDER IN TELLICHERRY GOATS

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ABSTRACT

The present study was conducted with the aim of establishing the basic data about gross morphometric measurements in lactating and non-lactating (n=15 each) adult Tellicherry she-goats. These goats had two mammary glands (right and left halves) divided by an inter mammary groove and each had a single teat. Udder circumference and inter teat distance differed between lactating and non-lactating animals. Udder length (UL) width of right (R-UW) and left (L-UW) quarter, right and left teat length, teat diameter at base (TDB), teat diameter at tip (TDT), Teatto floor distance (TFD) and teat end floor distance (TEFD), right and left teat diameter at base (TDB), right and left teat diameter at tip (TDT) did not differ between lactating and non-lactating Tellicherry she-goats.

Key Words: Morphometry, Tellicherry, Udder, Teat.

INTRODUCTION

The mammary gland is a modified cutaneous gland common to all female mammals. It is a milk-producing gland to nourish and protect neonate (Schmidt, 1971). Mammary gland morphology is generally accepted as a key factor for machine milkability and its inclusion in dairy goat improvement programs is widely recommended. The anatomical and morphological characteristics of the udder and its relationship with milk production, machine milkability and manageability in dairy sheep has become a greater interest from farmers to researchers (Rovai *et al.,* 2004).

Tellicherry goat is one among the recognized breeds of goats in India. It is widely distributed in Malabar region of Kerala and also reared in different places of Tamil Nadu. This breed is considered as a unique genotype exhibiting higher multiple birth percentages and higher milk yields (Sundaram *et al.,* 2012). Gross morphometric measurements in various machine milked sheep and goat breeds is reported by several authors. The present study is aimed to assess the udder morphometric traits in adult lactating and non-lactating Tellicherry she-goats that

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are reared in semi-intensive system during manual milking.

MATERIALS AND METHODS

The gross morphometric measurements of udder and teat were taken from thirty healthy Tellicherry she-goats in Post Graduate Research Institute in Animal Sciences unit of Tamil Nadu Veterinary and Animal Sciences University, Tamil Nadu. Animals were divided into two groups based on physiological status as lactating and non-lactating (n=15 each) group. The gross anatomical parameters of mammary gland such as udder length (UL) from base of the gland to the base of the teat along the inter-mammary groove, width of right(R-UW) and left (L-UW) quarter (distance between two lateral borders of the gland to the inter-mammary groove), udder thickness (UT) (the distance between cranial and caudal borders of the gland at base) and udder circumference (UC) at base were measured using measuring tape (Paramasivan, 2007).

The gross anatomical parameters of teats *via.,* (TL) teat length(distance between base and tip),teat diameter at base (TDB),teat diameter at tip(TDT), the inter-teat distance (ITD) at the base was measured using a measuring tape and vernier caliper (Paramasivan, 2007). (TDB) Teat to floor distance (distance between the base of the teat to the ground) and (TEFD) teat end floor distance (distance between the tip of the teat to the ground) for both right and left teats was recorded by using measuring tape (Venkatesan, 2014). SPSS26.0 for Windows was used for statistical analysis of data.

RESULTS AND DISCUSSION

Udder

Gross morphometric parameters such as udder thickness (UT) (cm), udder length (UL) (cm), right udder width (R-UW) (cm), left udder width (L-UW) (cm) and udder circumference (UC) (cm) in Tellicherry goats of both lactating and non-lactating animals were given in Table 1. Of these parameters, a significant difference ($P \leq 0.05$) was observed in udder thickness and udder circumference between lactating and non-lactating groups in she-goats. These findings were in agreement with the Martinez *et al.,* (2010) in Chilota and Suffolk Down sheep breeds, Abu *et al.*(2013) in West African Dwarf goats and Upadhyay *et al.* (2014) in local goats of Rohilkhand. This might be due to increased udder volume during lactation in globular shaped udder of Tellicherry she-goats.

Teat

Various gross morphometric measurements such as inter teat distance (ITD) (cm), right teat floor distance (R-TFD) (cm), left teat floor distance (L-TFD) (cm), right teat end to floor distance (R-TEFD) (cm), left teat end to floor distance (L-TEFD) (cm), right teat length (R-TL) (cm), left teat length (L-TL) (cm), right teat diameter at base (R-TDB) (cm), left teat diameter at base (L-TDB) (cm), right teat diameter at tip (R-TDT) (cm), left teat diameter at tip (L-TDT) (cm) were recorded in lactating and non-lactating Tellicherry goats (Table 1).Statistically, significant difference was recorded in inter teat distance between lactating and non-lactating she-goats. This is in accordance

with the findings of Rovai et *al.*(1999) in Manchega and Lacaune sheep breeds, who reported that the distance between teats did not show any changes in the first six week of lactation, and after that size of the teat and inter teat distance reduced after the weaning of lambs (non-lactating stage). This suggested that the productive capacity of the ewe is related to the distance between teats. No significant difference (P≥0.05) recorded in teat length (both right and left) between lactating and non-lactating animals. Between both lactating and non-lactating groups, the teat floor distance revealed no significant difference. These findings were in total agreement with Abu *et al.* (2013) in West African Dwarf goats. No significant difference was observed in teat end floor distance between lactating and non-lactating groups of ewes and she-goats. This is in agreement with the earlier findings of Venkatesan (2014) in cows. In both ewes and she-goats, no significant difference (P≥0.05) was observed in R-TDB, L-TDB, R-TDT and L-TDT between the lactating and non-lactating animals as reported by Paramasivan e*t al,* (2013) in Madras Red ewes.

Table 1. Mean ± SE of various gross morphometric measurements in udder and teat of Tellicherry she-goats.

Parameters (cm)	Mean ± SE		t-value
	Lactating (N=15)	Non-lactating (N=15)	
UT	10.50 ± 1.19	13.22 ± 0.55	2.40*
UL	12.00 ± 1.47	13.44± 0.70	1.01^{NS}
R-UW	6.25 ± 0.47	7.38 ± 5.34	1.27^{NS}
L-UW	5.37 ± 0.55	6.23 ± 0.66	1.15^{NS}
UC	26.33 ± 1.71	23.0 ± 1.69	2.42*
ITD	5.83 ± 0.86	4.25 ± 0.32	1.81*
R-TFD	35.87 ± 2.05	30.83 ± 1.64	1.77^{NS}
L-TFD	32.05 ± 2.71	31.07 ± 0.77	0.96^{NS}
R-TEFD	31.62 ± 1.71	29.22 ± 1.03	1.94^{NS}
L-TEFD	32.50 ± 1.84	29.63 ± 0.60	2.11^{NS}
R-TL	4.30 ± 0.82	4.47 ± 0.24	0.27^{NS}
L-TL	4.12 ± 0.82	4.16 ± 0.35	0.05^{NS}
R-TDB	1.01 ± 0.81	1.00 ± 0.13	0.05^{NS}
L-TDB	0.92 ± 0.09	0.96 ± 0.06	0.36^{NS}
R-TDT	0.54 ± 0.07	0.54 ± 0.05	0.07^{NS}
L-TDT	0.45 ± 0.17	0.52 ± 0.05	0.50^{NS}

NS - No significant (P>0.05)difference between lactating and non-lactating groups
* - Significant (P≤0.05) difference between lactating and non-lactating groups

It is concluded that the udder circumference and inter-teat distance differed between lactating and non-lactating Tellicherry goat; whereas, other morphometric measurements are similar between groups.

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