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# Udder morphology and milk partitioning in Canarian dairy goats. Changes as consequence of different milking frequencies

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## SUMMARY

In the aim to study the udder characteristic and milkability of the Canary Island dairy goat, a herd was evaluated during 1st and 2nd lactation. 52 goats were blocked into two milking frequency group: once daily (x1, n=28) and twice daily (x2, n=24). Measurements of udder (six traits) and teats (five traits) were recorded at two months after parturition. Milk partitioning (MM, machine milk; MSM, machine stripping milk; and RM, residual milk) were recorded one time in 1st lactation, and in four times in 2nd lactation.

Once-a-day milking increased dramatically the volume of the udder in both lactations. Udder depth, distance to floor and distance between teats were in correspondence with udder volumes. Mean floor distances varied from 21 to 23 cm, in x1 milked goats, and from 23 to 25 cm in x2 milked goats. Mean milk partitioning (MM:MSM) ranged between 78-80:20-22 and 71-78:29-32, for x1 and x2 groups respectively, being the differences significant by milking frequency. Higher RM values were obtained in the x1 milked goats (294 ml, 13%) compared to x2 milked (155 ml, 7%). Correlation between udder volume and milk partitioning parameters showed a closer rela-

tionship between MM volume and perimeter being MSM and RM more independent.

## INTRODUCTION

Although for some authors the correlation's between udder morphology and production levels are very low, (Mikus and Mikus, 1987; Mavrogenis *et al.*, 1989), others consider that it is higher and can reach significant levels (Linzell, 1966; Peris, 1944). On the other hand, the influence of the number of lactation and udder parameters have been revealed (Knight and Peaker, 1982; Le Du and Bermerdel, 1984; Knight and Wilde, 1993) thus these sources of variation should be taken into consideration when a project is undertaken. Furthermore the confirmation of the udder conditions the machine milkability (MMA) (Le Du and Benmeberdel, 1984; Peris, 1994) which, given the characteristics of the Canarian goats (Capote 1989; Knight 1996) should be notably affecting a series of dairy farms which are increasingly using milking parlour.

This study aim at describing the influence of the frequency of milking and the number of lactation on the morphology of the udders and milk partitioning in tinerfeñan goats belonging to the CCG.

Table 1  
Average and standard deviation for studied measurement traits

		L1	L2			L1	L2			L1	L2
TF	x1	26.9±2.3 <sup>a</sup>	26.1±2.4 <sup>a</sup>	CF	x1	22.8±2.2 <sup>a</sup>	21.9±2.1 <sup>a</sup>	ILF	x1	24.8±2.6 <sup>a</sup>	23.1±2.2 <sup>a</sup>
	x2	26.4±2.1 <sup>a</sup>	27.2±2.5 <sup>a</sup>		x2	23.5±2.1 <sup>a</sup>	23.0±2.2 <sup>ab</sup>		x2	25.3±2.5 <sup>a</sup>	23.6±2.2 <sup>a</sup>
TL	x1	26.0±0.8 <sup>a</sup>	27.6±0.7 <sup>a</sup>	DT	x1	23.6±0.4 <sup>a</sup>	26.39±0.4 <sup>a</sup>	IUF	x1	42.9±0.4 <sup>a</sup>	47.5±0.3 <sup>a</sup>
	x2	28.9±1.9 <sup>ab</sup>	32.2±1.1 <sup>ab</sup>		x2	22.0±1.9 <sup>ab</sup>	23.9±1.9 <sup>ab</sup>		x2	41.5±0.4 <sup>ab</sup>	46.8±0.4 <sup>a</sup>
WC	x1	25.9±2.8 <sup>a</sup>	25.8±2.5 <sup>a</sup>	UV	x1	3687±595 <sup>a</sup>	4645±664 <sup>ab</sup>	PIU	x1	49.1±0.8 <sup>a</sup>	51.9±0.8 <sup>a</sup>
	x2	22.9±1.9 <sup>ab</sup>	24.1±2.2 <sup>ab</sup>		x2	2808±661 <sup>ab</sup>	3488±639 <sup>ab</sup>		x2	42.9±0.8 <sup>a</sup>	47.8±0.8 <sup>a</sup>
CD	x1	19±1.6 <sup>a</sup>	13±0.9 <sup>a</sup>	CH	x1	4.1±2.1 <sup>a</sup>	4.2±2.0 <sup>a</sup>	TAV	x1	67.4±1.9 <sup>a</sup>	69±10.6 <sup>a</sup>
	x2	20±1.7 <sup>a</sup>	0.6±0.9 <sup>ab</sup>		x2	2.9±1.92 <sup>ab</sup>	4.2±2.0 <sup>a</sup>		x2	55.5±10.1 <sup>ab</sup>	63±11.4 <sup>ab</sup>
UD	x1	18.2±2.5 <sup>a</sup>	16.2±1.4 <sup>a</sup>	TAH	x1	55.1±10.3 <sup>a</sup>	64.5±11.2 <sup>a</sup>		x1	55.1±10.3 <sup>a</sup>	64.5±11.2 <sup>a</sup>
	x2	24.5±2.0 <sup>ab</sup>	23.1±2.9 <sup>ab</sup>		x2	56.0±9.9 <sup>a</sup>	66.0±8.1 <sup>a</sup>		x2	56.0±9.9 <sup>a</sup>	66.0±8.1 <sup>a</sup>

TAV(°) Teat implantation angle taken in a vertical plane; TAH(°) Teat implantation angle taken in a horizontal plane; TL (mm) Teat length; TF (cm) Teat-floor distance; CF (cm) Cistern-floor distance; ILF (cm) Intermammary ligament-floor distance; DT (cm) Distance between teats; IUF (cm) Insertion of the udder-floor distance; PIU (cm) Perimeter of insertion of the udder; UV (ml) Udder volume; WC (cm); Width of the cistern of the empty udder; CH (cm) Cistern height; CD (cm) Cistern depth; UD (cm) Udder depth  
 Different letters indicate significant differences (<sup>ab</sup> rows; <sup>cd</sup> columns)

Table 2  
Comparison of quantities of milk in each partition obtained by mechanical milking of goats of the Canary Caprine Group according to the frequency of milking (means ± standard deviation)

Lact (n°)	Time (d)	MM		MSM		RM	
		X1	X2	X1	X2	X1	X2
1	135	1.513 <sup>a</sup>	1.443 <sup>a</sup>	375 <sup>a</sup>	582 <sup>b</sup>	292	113 <sup>b</sup>
		±377	±396	±147	±124	±111	±77
2	45	2.052 <sup>a</sup>	1.987 <sup>a</sup>	522 <sup>a</sup>	758 <sup>b</sup>	331	198 <sup>b</sup>
		±504	±672	±236	±279	±212	±163
	90	2.038 <sup>a</sup>	1.582 <sup>b</sup>	530 <sup>a</sup>	729 <sup>b</sup>	251 <sup>a</sup>	247 <sup>b</sup>
		±591	±526	±223	±315	±131	±175
	135	1.680 <sup>a</sup>	1.582 <sup>a</sup>	434 <sup>a</sup>	741 <sup>b</sup>	341 <sup>a</sup>	192 <sup>b</sup>
		±570	±459	±201	±215	±167	±135
	180	1.335 <sup>a</sup>	1.249 <sup>a</sup>	474 <sup>a</sup>	803 <sup>b</sup>	261 <sup>a</sup>	152 <sup>b</sup>
		±460	±481	±171	±256	±140	±98

Lact.- Lactation. d.- Days. MM.- Machine milk. MSMM.- Machine stripping milk. RM.- Residual milk. x1 - Milking once daily. x2.- Milking twice daily. Different letters in the same row indicate statistically significant differences (p<0.05).