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# Variation through the first half of lactation in bulk tank somatic cell counts for Murciano-Granadina goats

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**SUMMARY** – In contrast with cow's milk, the legal limit for somatic cell counts (SCC) for small ruminants has not yet been established in the European Union. Compared to sheep and cow's milk, there are many factors affecting goat milk SCC. This study reports on the changes in bulk tank SCC for eight goat herds through the first half of two lactations (1997-98 and 1998-99). For each lactation, bulk tank SCC were determined daily for five consecutive months (November to March). Global geometric means for both lactations were 973,000 cell/ml (1997-98) and 719,000 cell/ml (1998-99), which means an important improvement on the SCC of the herds. During both lactations, SCC profiles for the eight herds were similar. The mastitis control programme implemented at the end of the first lactation resulted in reduced SCC for all eight herds. During both lactations bulk tank SCC for all the herds were below the suggested limit of 1,500,000 cell/ml proposed for goats and ewes by the scientific committee of the International Symposium "Somatic Cells and Milk of Small Ruminants" of Bella in 1994. Prevalence of subclinical mastitis, level of milk production and number of primiparous goats were important factors contributing to increased bulk tank SCC.

**Key words:** Goat, somatic cell counts, bulk, official rule.

**RESUME** – "Variation pendant la première moitié de la lactation des comptages de cellules somatiques en réservoir de réfrigération pour des chèvres de race Murciano-Granadina". Contrairement à ce qui arrive chez les bovins, la limite des cellules somatiques pour le commerce du lait de tank n'a pas encore été établie. Différemment de ce qui arrive chez les ovins et bovins, beaucoup trop de facteurs modifient le comptage cellulaire chez le caprin. Cette étude rassemble l'évolution des comptages cellulaires en lait de tank de huit troupeaux pendant deux lactations (1997-98 et 1998-99). Pour chaque lactation, les comptages cellulaires ont été déterminés (journallement) chaque jour pendant cinq mois consécutifs (de novembre à mars). Les moyennes globales pour chaque lactation ont été 973 000 cel/ml (1997-98) et 719 000 cel/ml (1998-99), ce qui représente une remarquable amélioration dans la situation cellulaire des troupeaux. Pendant les deux lactations, les profils de l'évolution cellulaire ont résulté être similaires. Le programme de contrôle de la mammite entamé à la fin de la première lactation a déterminé la réduction des comptages cellulaires chez les huit troupeaux. Pendant les deux lactations, les comptages des troupeaux ont été inférieurs à la limite suggérée par le comité scientifique du Symposium International sur les cellules somatiques dans le lait de petits ruminants de Bella (1994). La prévalance des mammites subcliniques, le niveau de production de lait et le nombre de chèvres primipares ont résulté être des facteurs qui ont contribué à l'augmentation des cellules somatiques dans le lait de tank.

**Mots-clés :** Chèvre, comptages de cellules somatiques, troupeaux, réglementation.

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## Introduction

The European Union (EU) has established a legal limit for bovine milk but not one for caprine or ovine milk in the Directive EEC/92/46 (1992). This situation is only temporary because the EU has suggested establishing in the future a legal bulk tank SCC limit for small ruminants milk. In the United States, a legal limit of 1,000,000 cell/ml of milk was established and goat farmers frequently cannot meet this legal limit (Droke *et al.*, 1993). At the International Symposium "Somatic Cells and Milk of Small Ruminants" (Bella, Italy, 1994), it was suggested to the EU authorities that a legal limit for bulk tank goat and sheep milk SCC should not be lower than 1,500,000 cell/ml (Barbosa *et al.*, 1994). Because of the higher level of SCC in caprine milk, when compared to counts in bovine and ovine milk, we thought it was important to study factors contributing to the variation in SCC over the first half of lactation and the impact of a mastitis control program on caprine milk SCC.

## Material and methods

Bulk tank milk samples from 8 Murciano-granadina goat herds were studied daily for SCC during the first half of lactation (November to March). The study was carried out during two different lactations (1997-98 and 1998-99). All herds were machine milked and belonged to the breeding association ACRIMUR and practiced the associations mastitis control program. The management practices and health status of the eight herds studied were excellent and not representative of the rest of the herds in our region of the country. The mastitis control plan consisted of postmilking teat dipping and good milking machine maintenance. For the herds involved in this study, selective treatment of infected udder halves with antibiotics at drying off was also implemented, and goats with chronically infected halves or positive for mycoplasmas were removed from the herds.

After thorough mixing of the bulk tank milk, milk samples (n=1416) were collected into plastic tubes containing azidol as a preservative, refrigerated and shipped to the laboratory. The SCC was determined after 24 hours using an opto-fluoro-electronic counter (Fossomatic 90®) on milk maintained at 40°C. The results were converted to logarithmic scale for calculation of the geometric mean of weekly SCC according to Andrews *et al.* (1983). The moving average was used in order to detect the temporal trend of the SCC (Thrusfield, 1995).

Herd health and milk production information of the studied herds are shown (Table 1).

Table 1. Production and health records of the studied goat herds<sup>†</sup>

	Herds							
	1	2	3	4	5	6	7	8
Lactation 97-98								
CAE	0	0	53	38.1	0	7.4	0	8.5
CM	0	14.7*	2.2	0	0	7*	0	7*
SM	42.9	19.1	11.2	17.8	6.7	19.3*	12.1	4.7*
IMP	272.1	321.7	520.9	487.9	533.4	318.8	528.7	358.1
RPG	19.1	9.7	25	17.5	23.8	9.3	21	23.8
ROG	0	15.3	3.1	4.5	5.3	0	2.9	0.7
SCC	1047	1191	1083	968	626	716	774	601
RTG	93.2	40.6	11.2	100	8.8	26.3	9.1	6.7
Lactation 98-99								
SCC	628	914	662	559	395	677	663	562
RRSCC	40	23.2	38.8	42.2	36.9	5.4	14.3	6.5
RC	54	50	83	80	85	66	100	66
RNI	9.7	12.5	4.1	4.8	8.1	11.2	8	12.3

<sup>†</sup>CAE: seroprevalence of caprine arthritis encephalitis virus; CM: prevalence of clinical mastitis; SM: prevalence of subclinical mastitis; IMP: individual milk production; RPG: rate of primiparous goats; ROG: rate of goats with more than 7 parturitions; SCC: geometric mean of somatic cell count for the studied period; RTG: rate of dry antibiotic treated animals; RRSCC: rate of reduction of somatic cell counts; RC: rate of curation of animals persistently infected and treated when dry off; RNI: rate of new infection at kidding.

\*Presence of clinical or subclinical mycoplasmas infections.

## Results and discussion

Figure 1 shows the temporal trend of SCC for the 8 herds during the 15 weeks of the study for both lactations. Global geometric means for both lactations were 973,000 cell/ml (1997-98) and 719,000 cell/ml (1998-99), which means an important improvement on the SCC of the herds. The SCC profiles for both lactations were similar but a reduction in SCC was observed during the last lactation (98-99). In both lactations the SCC were highest after parturition and decreased for the

remainder of the lactation. Because milk sampling concluded at week 15 of lactation, we could not determine the typical and physiological increase in SCC reported to occur during late lactation (Sánchez *et al.*, 1998).

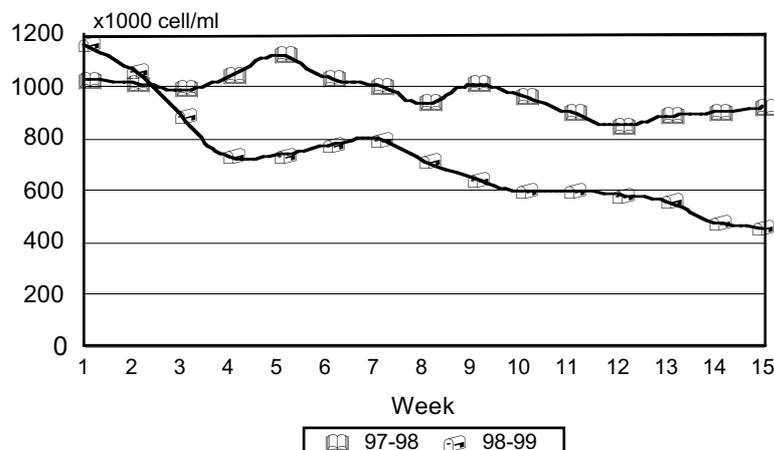


Fig. 1. Weekly SCC (moving average of daily bulk tank SCC) for 8 goat herds for two consecutive lactations (1997-98, 1998-99).

Most of the herds (7/8) had lower SCC in the last lactation and this decrease was significant ( $P < 0.01$ ) for 6 of the herds when compared to their SCC results during the first lactation (Fig. 2). We attribute this reduction in SCC to the initiation of the mastitis control program in the 8 herds studied. However, the SCC still remained higher than that reported for cows and sheep. All herds studied were below the suggested limit of 1,500,000 cell/ml for milk from goats and ewes proposed by the scientific committee of the International Symposium "Somatic Cells and Milk of Small Ruminants" of Bella in 1994. However, it should be pointed out that these are good herds and are not representative of the herds in this region of Spain, and only the first half of lactations was studied.

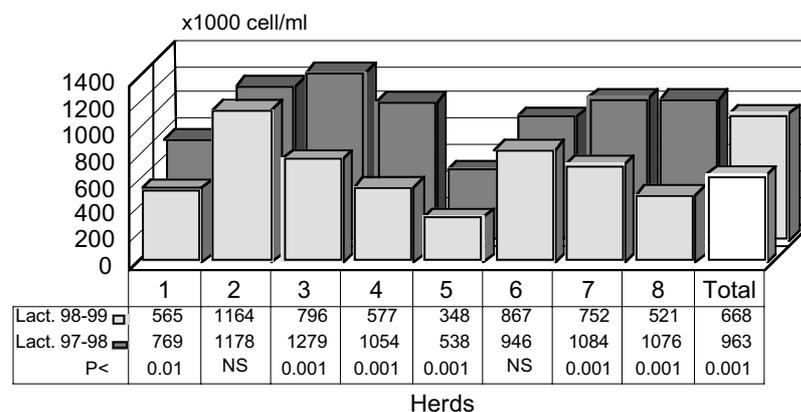


Fig. 2. Geometric mean somatic cell counts for the 8 goat herds for two consecutive lactations.

These are preliminary data and the final statistical analysis is not yet completed. However, it could be observed that several factors seem to be involved in higher SCC for bulk tank goat milk. These are prevalence of subclinical mastitis, level of milk production and number of primiparous goats in the herd (Table 1). These three factors have been related to increased SCC in individual foremilk samples (Paape and Contreras, 1997), and seem to also increase SCC for bulk tank milk samples. Importantly, the results from this study have established that intramammary infection is the main cause of increased SCC in goats, and should be a major point to focus on for reducing bulk tank milk SCC for goats.

## Conclusions

Somatic cell counts were lower when goat herds developed mastitis control procedures.

All herds studied were below the suggested SCC legal limit of 1,500,000 cell/ml.

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