

SWARD HEIGHT EFFECTS ON SWARD COMPOSITION AND ANIMAL PERFORMANCE IN GRASS/CLOVER SWARDS CO-GRAZED BY SHEEP AND GOATS

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ABSTRACT

A mixed herd of yearling cashmere bucks plus Gallega and Lacha ewes rearing single lambs continuously grazed lowland perennial ryegrass (*Lolium perenne*) / white clover (*Trifolium repens*) swards on two contrasting sward surface heights of 8.3 (High) or 5.9 cm (Low) over a 100-day spring grazing period. Performance results showed that ewes and bucks had respectively an extra 2.6 and 2.0 kg of liveweight gain in the High height treatment while lambs replenished 185 (High) and 198 (Low) g of daily liveweight. Significant increases of live clover occurred in both sward height treatments and that was especially more marked in the surface layers ($P < 0.001$) where dead and ryegrass stems appeared in fewer proportions than in the bottom horizons. It is concluded that yearling bucks, independently of their physiological state, can fit well under simultaneously grazing with ewes and lambs on grass/clover swards maintained within the 9 - 6 cm height range to benefit sheep performances, clover enhancements and sward reproductive and senescent deferments.

KEYWORDS

mixed species grazing, sheep, goats, clover, sward height, performance.

INTRODUCTION

Cashmere-producing goats have been recently established on temperate and natural pastures of Northern Spain as an adequate management tool to complement sheep grazing. A previous work performed in lowland grass/clover swards by Osoro and del Pozo (1996) has showed that alternate or concurrent grazing with goats improved ewes' and lambs' growth rates during lactation period accompanied with sward clover increases. However, a further detailed examination of this study by del Pozo and Osoro (1997) pointed out that nannies and their suckling kids were not particularly benefited by grazing concurrently with sheep and emphasized caution when mixed management policies with breeding goats are accomplished. Under these premises, del Pozo and Wright (1995) suggested in Scottish conditions to alternate yearling cashmere males with sheep to provide extra ovine performances without a penalty in goat productivity but at southern latitudes high seasonal variations on pasture availability usually occur, and hence, it seems better instead of separate grazing to call for a concurrent goat-sheep management. Since at present there is a lackness of guidelines available to manage yearling bucks with sheep, this study examines in perennial ryegrass/white clover swards the effects caused by their co-grazing management under different herbage allowances on sward composition and animal performance.

METHODS

In 1996, perennial ryegrass (*Lolium perenne* L. cv. Phoenix) / white clover (*Trifolium repens* L. cv. Huia) pastures were continuously grazed by combinations of 40 Lacha and Gallega ewes (44.2 kg LW) rearing their single lambs (12.8 kg LW) with 39 yearling bucks castrated or entire (33.6 and 36.8 kg LW respectively) at two different sward heights (High or Low) from 11 March (turn-out) to 19 June (lamb weaning). The pasture site was on an experimental area sown in November 1991 and located at 50 m a.s.l. in La Mata Research Farm, Asturias, North of Spain. Treatment paddocks were of 0.7 ha size each, replicated once and grazed by groups of sheep and goats

mixed on a per head basis of 1:1 and balanced as far as possible on lactating ewe breed and on buck physiological state. Sward surface heights were controlled once weekly with an HFRO sward stick (Barthram, 1986) by measuring 40 readings randomly in each paddock. The livestock were weighed and their body condition scored (Russel et al., 1969) at the beginning of the experiment (11 March), end (19 June) and on 2 April, 30 April, and 29 May dates. Additionally, the relative abundance of the different herbage components in the sward canopy were estimated in each paddock by recording stratified contacts at 25 points laid out at random with an inclined point-quadrat (32.5 °) on 11 March, 3 April, 30 April, 27 May and 19 June dates. Simultaneously, 100 point estimates were made randomly across each paddock on a "first hit" basis to describe surface composition. Data were analysed using Genstat 5.2.

RESULTS AND DISCUSSION

From the beginning of the experiment, mean sward surface heights were maintained close to the target of 8 and 6 cm heights in the High and Low sward height treatments respectively with an overall mean sward height of 8.3 and 5.9 cm (sed 0.28). Following the Gibb and Ridout (1986) procedure, the proportion of sward heights measured above 10 cm were compared in both height treatments. Only 0.05 and 0.02 proportions from a total of 1120 sward heights were measured on the High and Low height treatments to fall above 10 cm ($c^2 = 1.5$; NS) and no binomial distribution of heights corresponding to frequently and infrequently grazed areas were found. These results are in agreement with the findings of Nicol and Collins (1990), who observed that goats concentrate their grazing in the upper sward horizons whereas sheep grazed deeper into the sward and that likely complementarity of grazing behaviour can reduce the frequency of long herbage patches in the sward under a mixed management and produce therefore evenly high swards. The mean stratified botanical composition and liveweight (LW) performances of the different experimental animals are presented at each sampling date for both height treatments in Figures 1 and 2 respectively. In the whole sward, the clover laminae-petiole component significantly increased ($P < 0.001$) from the beginning of the trial in 0.18 and 0.23 proportion units over the High and Low height treatments respectively (sed 0.025). Also, clover stolons and flowers increased both their presences significantly ($P < 0.01$ and $P < 0.001$) in the two height treatments. Observations of clover increments in sown swards grazed by goats and sheep have been previously documented under european conditions by studies performed by del Pozo and Wright (1995) and by Osoro and Martinez (1995). Both experiments suggested that the depletion or avoidance of clover by these stock species might be influenced in part by its accessibility within the sward grazed horizon. By the end of the experiment, the clover lamina-petiole proportions had higher values ($P < 0.05$) on the sward surface than in the whole sward of the High (0.34 versus 0.25) and Low (0.38 versus 0.27) height treatments (sed 0.025) whereas the grass leaf presence diminished ($P < 0.001$) its predominance on the surface layers. The presumable goat non-consumption of clover seemed to reverse the seasonal effect of ryegrass shading white clover during spring, the latter becoming predominant in the top sward layers. In contrast to clover, the stem and dead material contents of both height treatments did not increase over the experiment and was mainly concentrated in the lower horizons. That outcome was in accordance with previous trials of goat mixed managements (Clark et al., 1984; Radcliffe et

al., 1991) and reinforced, therefore, in sown swards the attractiveness of goat grazing for controlling undesirable phenological developments such as flower and seed head accumulations. The sward height allowances and the increment on the availability of green matter, especially live clover fractions, were probably the main determinants of the performances in bucks and ewes. Yearling bucks and lactating ewes had better individual liveweight responses in the High (53 and 67 g LW/d respectively) than in the Low height treatments (32 and 41 g LW/d respectively). However, there were not overall differences in buck liveweight gains due to their castrated or entire condition. In contrast to ewes and bucks, lambs' performances were not so affected by the resulting sward height of the different treatments (185 and 198 g LW/d in the High and Low height treatments respectively), probably due to the fact that the milk supplied by their dams might have buffered their body weight replenishments to a large extent and limited their intake capacity. Nevertheless, lamb weight gains were higher than those recorded by Martinez and Osoro (1995) under similar management conditions on solely sheep grazing. Therefore, the choice in spring of a mixed goat-sheep management on grass/clover pastures was supported in both sward height treatments by satisfactory animal outputs accompanied in the sward with either improvements on green clover presence and constraints on the build-up of reproductive and dead material.

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Figure 1

The vertical distribution of ryegrass (leaf, stem and dead) plus clover (laminae-petiole, stolon, flower and dead) components in the High or Low sward height treatments. Data are expressed as number of point-quadrat hits measured per 100 loci in each 1 cm horizon at each sampling control.

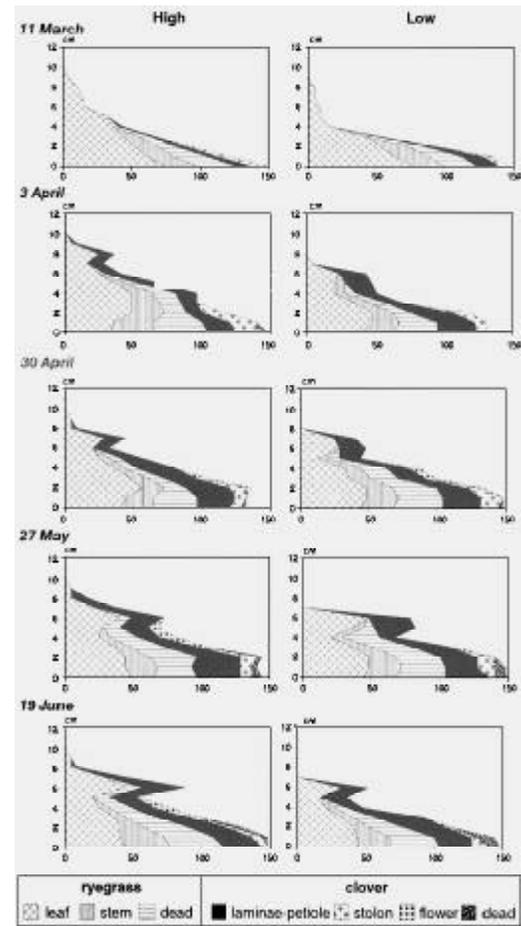


Figure 2

Liveweight changes of the experimental bucks (a), ewes (b) and their single lambs (c) over the experimental period when grazing mixed two sward height treatments (High or Low).

