

# CANOPY CHANGES IN HEATHLANDS (*ERICA* - *ULEX*) GRAZED BY SHEEP OR GOATS

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## ABSTRACT

The grazing effects of sheep and goats on vegetation dominated by heaths (*Erica* spp) and gorse (*Ulex gallii*) were studied for two years. Two plots were grazed from May to October 1992 by 7 ewes or 7 does and in the following year each plot was subdivided into two subplots subsequently grazed either by sheep or by goats in a factorial design.

During the first grazing season both sheep and goats reduced similarly the cover percentage of shrubs since the herbaceous content was scarce, although goats reduced more the height of the shrubs than sheep. The cover of dead matter increased notably in both treatments due to the new gaps formed in the canopy. In the second year the different grazing behaviour of sheep and goats became apparent in the vegetation since the content of shrubs decreased and herbaceous species increased more in the goat than in the sheep grazed plots.

## KEYWORDS

Canopy, heath, gorse, sheep, goat

## INTRODUCTION

Heathlands spread over large areas of the marginal lands of north-west of Spain, since they were abandoned by the majority of rural population. The poor economic return of these natural resources, due to the low nutritive value of their shrubby vegetation for the grazing ruminants, is aggravated since fires are frequent, causing the progressive loss of soil fertility.

Grazing animals under extensive management can be utilized as a tool for a more effective control of the vegetation canopy. Goats are known to be more effective than sheep to utilize the woody species which are rejected by sheep, so allowing a greater development of the herbaceous plants.

The objective of this study was to know the effects of sheep and goats' grazing on a shrubby vegetation composed mainly of *Ericaceous* species and gorse.

## MATERIALS AND METHODS

The experimental plots were located at 1000 m.a.s.l. in a humid region of West Asturias (North-West Spain). The soils were acid and poor because of the slatty nature of the substratum. The vegetation was dominated by heaths (*Erica cinerea*, *E. umbellata*, *Calluna vulgaris*) and gorse (*Ulex gallii*) with grasses (*Agrostis curtisii*, *Pseudarrhenatherum longifolium*) being the most abundant of the herbaceous species.

In 1992 two plots of 0.3 ha each were set-stocked with 7 ewes or 7 does from May to October. In 1993, each paddock was halved in two subplots and each was grazed from May to October by 3 animals, sheep or goats, according to a factorial design.

The cover percentage and the height of the plant species were controlled on each plot by using a vertical point quadrat method (Grant, 1981) on five transects 4 metres long and recording 100 contacts per transect. These controls were performed in May 1992, May 1993, October 1993 and May 1994. The differences between treatments were analyzed using Genstat 5.2 statistical package.

## RESULTS AND DISCUSSION

During the 1992 grazing season, the cover percentage of the woody shrubs (heaths + gorse) diminished more in the goat treatment (-17.2) than in the sheep treatment (-12.4), though the differences did not reach significance. The small differences observed in the evolution of the *Ericaceous* species between the goat (-13.2) and the sheep (-11.6) grazed plots, were partly due to the different initial contents of *Erica cinerea* and *E. umbellata* in both plots and to the different response of each heath species to grazing. *Erica cinerea* increased its cover from May 1992 to May 1993 (+10.6 sheep, +5.8 goats) owing to its ability for new growth from the stem base, whereas *E. umbellata* did not withstand the intense defoliation and decreased drastically its percentage (-17.6 sheep, -20.0 goats).

Also there were not significant differences between the treatments in the evolution of the other components of the canopy in the first year, although gorse cover decreased more in the goat (-4.0) than in the sheep treatment (-1.2) and the reduction of herbaceous species was greater in the sheep (-5.8) than in the goat treatment (-4.2). The cover of dead matter increased notably through both plots because of the new gaps formed in the canopy due to the effects of grazing and trampling (Figure 1).

Significant differences were observed between treatments ( $p < 0.05$ ) in the variation of shrub height during 1992. In the sheep treatment the mean height diminished less than 1 cm whereas in the goat plot it decreased 7.2 cm (Figure 2).

Sheep reduced the shrub cover in the first year when the availability of herbaceous species was scarce, but in the second year its distinct grazing behaviour with regard to goats became clear. During the 1993 grazing season, the cover of live shrubs increased from May to October in the sheep treatments, whereas it was reduced in the plots grazed by goats ( $p < 0.05$ ). This reduction was greater in the plot that was grazed by sheep during 1992. There were not significant differences in the evolution of herbaceous species from May to October, though their cover decreased more in the sheep than in the goat treatments. From May 1993 to May 1994, the increase of herbaceous cover was significantly ( $p < 0.01$ ) greater in the plots grazed by goats (Figure 1).

The mean height of shrubs decreased significantly more ( $p < 0.01$ ) from May 1993 to May 1994 in the goat plots (-5.4 cm) than in the sheep ones (-1.8 cm), especially in that plot that was previously grazed by sheep during 1992 (Figure 2). There were not significant differences in the height of herbaceous species. In contrast to sheep, the height of dead matter increased in the goat plots during the 1993 grazing, owing to a higher percentage ratio of dead shrubs to herbaceous litter.

These results agree with other studies performed on similar shrubby vegetations. In Scottish hills, *Calluna vulgaris* and other coarse weeds were grazed earlier and more heavily by goats than by sheep (Grant *et al.*, 1984). The greater utilization of gorse by goats than by sheep has been observed in New Zealand (Clark *et al.*, 1982; Radcliffe, 1985) and in Northern Spain (Osoro *et al.*, 1996).

It is concluded that goats make a more efficient use of woody plants

like heaths and gorse than do sheep, favouring a higher presence of herbaceous species in the canopy. That should improve the nutritive value of the vegetation available to sheep.

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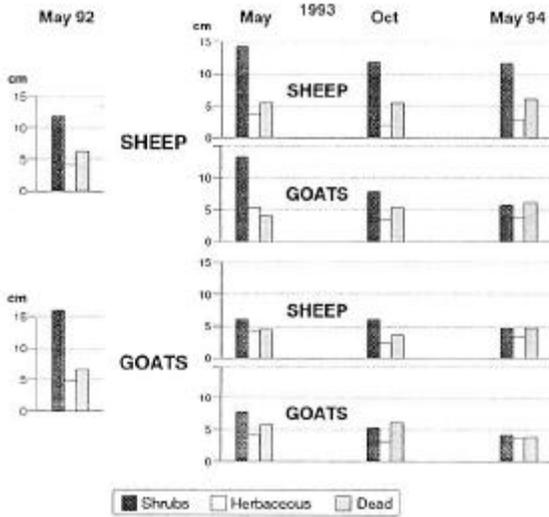
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**Figure 1**

Evolution of the canopy cover in heathlands grazed by sheep or goats



**Figure 2**

Evolution of the canopy height in heathlands grazed by sheep or goats.

