Effect of winter grazing on the protein contents of alfalfa spring regrowth

Chocarro C., Lledó M., Fanlo R., Lloveras J.

in

Delgado I. (ed.), Lloveras J. (ed.).
Quality in lucerne and medics for animal production

Zaragoza : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 45

2001
pages 253-255

Effect of winter grazing on the protein contents of alfalfa spring regrowth

C. Chocarro, M. Lledó, R. Fanlo and J. Lloveras
ETSEA, Universitat de Lleida, Av. Rovira Roure 177, 25198 Lleida, Spain

SUMMARY – Alfalfa is frequently grazed in the Ebro Valley (Spain) during the winter. Winter grazing of alfalfa can influence its subsequent spring regrowth. A summary of nine experiments conducted over three years under irrigated conditions show that the winter grazing of alfalfa by sheep slightly reduces the dry matter yield of the first spring harvest. However, the quality of the forage increased because of the lower number of weeds and the higher protein content.

Key words: Forage quality, grazing, alfalfa.

RESUME – *"Effet du pâturage d'hiver sur la teneur en protéine de la repousse printanière de luzerne". Dans la vallée de L'Ebre (Espagne), les cultures de luzernes sont fréquemment pâturées par les brebis pendant l'hiver. Ce pâturage peut influer sur la production de printemps et sur la qualité (teneur en matières azotées). Avec ce travail, nous pouvons conclure que le pâturage d'hiver a l'avantage de favoriser le développement de nouveaux bourgeons végétatifs, et donc la teneur en matières azotées ; mais diminue la production printanière de MS.*

Mots-clés : *Qualité fourragère, pâturage, luzerne.*

Introduction

The use of alfalfa for grazing has been reported by several authors (Delgado, 1984; Wynn-Williams *et al*., 1991; Bell and Guerrero, 1997). Used as a pasture, alfalfa has a low energy content and can cause health problems (bloat), mainly when harvested at young stages.

Furthermore alfalfa contains phytoestrogen that can impair the reproductive cycle of the ewes reducing the number of born lambs (Delgado, 1984).

In the Ebro Valley, alfalfa is pastured by sheep only during the winter when the crop is "dormant" or the growth is reduced. In this season, sheep graze on the autumn alfalfa regrowth or the unharvested alfalfa. Some farmers believe that winter grazing causes a dry matter (DM) yield reduction following spring. Sheep owners believe that winter grazing is beneficial for the crop (Fanlo *et al.,* 1999). Studies by Delgado *et al*. (1992) in the Ebro Valley show that when alfalfa was grazed in advanced physiological stages, that allowed the reposition of root reserves, no decrease in persistence was observed.

The objective of this three-year study was to research the effects of winter grazing on the forage production and quality of the alfalfa spring regrowth.

Materials and methods

The experiments were conducted in irrigated conditions for three consecutive winters, 1998, 1999 and 2000, at the IRTA-University of Lleida irrigated research fields at Gimenells (Ebro Valley, Spain) (41º39'N, 0º51'E), on a Calcixerolic Xerochrept type of soil, with a loam texture.

Each year research plots were established in three different fields at the same location separated by approximately 1.5 km. The treatments studied were grazed with sheep vs. not grazed. Four plots of 5 5 m were established in each field and the not grazed area was compared with the grazed area, also of 5 5 m between the not grazed plots (Fig. 1). The statistical design was a randomised design with four replications per field.

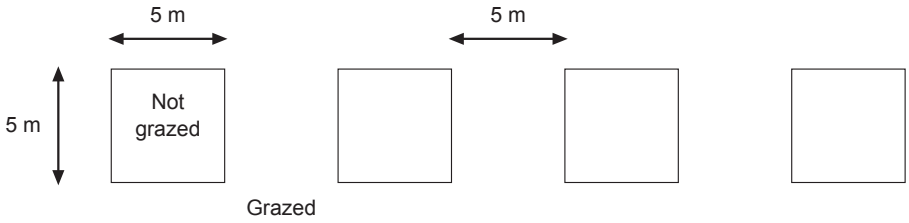

Fig. 1. Basic experimental design for each field.

The evolution of forage biomass in grazed and non grazed areas was evaluated five times in 1998 and 1999 and four times in 2000. An evaluation of the autumn alfalfa regrowth, and the possible unharvested alfalfa leftovers, was conducted every year by mid January just before the winter grazing. The evolution of the biomass was evaluated and measured approximately every three-four weeks from the day of grazing until the first spring harvest, by mid April, by harvesting two quadrats of 0.5 0.5 m per replication. In each harvest date, the forage for each quadrat was weighted and a subsample of about 500 g per replication was taken for the separation of each fraction: alfalfa, weeds and litter, and also for the determination of crude protein (CP) contents. The three fractions were dried for 24 hours at 70ºC and the proportion of each part was calculated on a DM base. The dried samples were used for the crude protein evaluation. The dried samples were ground to pass through a 1-mm screen of a cyclone mill. The total N was analysed using a InfraAnalyzer 2000, a Bran+Luebbe, model of a NIRS system.

The normality of the data was analysed using the Kolmogorov-Smimov contrast, the procedure to combine over years and locations using the SAS system. Fields and years were considered random effects.

Results and discussion

Table 1 presents the average DM yields, the proportion of alfalfa and the CP contents of the three years. For every sampling date, the values are the average of the three fields and eight replications by treatment per field.

Table 1. Average values of dry matter (DM) production and alfalfa and crude protein (CP) concentrations for the treatments, for the sample days from the beginning of the spring regrowth until the first harvest (Gimenells trials, 1998, 1999, 2000)

Sample dates	Treatment	DM (g/m^2)	Alfalfa (%)	CP (%)
1	Initial. Before grazing (mid January)	102.69	28.47	20.98
2	Not grazed	174.53 a	42.01 a	24.65 a
	Grazed	109.8 b	44.61 a	27.45 b
3	Not grazed	300.62 a	52.16 a	23.41 a
	Grazed	253.62 b	63.76 b	24.85 b
4	Not grazed	343.31 a	54.00 a	22.24 a
	Grazed	306.26 b	61.60 b	24.28 b

[a,b]Means on the same sample date followed by the same letter are not significantly different at the $p < 0.05$ according to Duncan's test.

The results presented in Table 1 show that the DM production of the grazed areas was always lower than those of the non grazed areas. However the proportion of alfalfa and the CP contents on the forage were always higher in the grazed than the non grazed plots. The statistical differences were significant on most of the sampling dates.

Similar results were obtained in New Zealand (Wynn-Williams *et al.,*1991) and California (Bell and Guerrero, 1997) who found that winter treating of alfalfa reduced weed infestations on the subsequent spring regrowth of alfalfa. They also found a small but significant decrease on DM production at the first spring harvest.

Conclusions

The results obtained during three years in the irrigated conditions of the Ebro Valley show that the winter grazing of alfalfa could be an interesting practice. Although winter grazing reduced the DM yields of the first spring harvest, it increased the quality of the crop, reduced the amount of weeds, and increased the CP protein contents of the forage.

Acknowledgements

This study has been supported by SC98-013-C2-2 project by INIA (Spanish Institute of Agricultural Research).

References

Bell, C. and Guerrero, J. (1997). Sheep grazing effectively controls weeds in seeding alfalfa. *California Agriculture*, 51(2): 19-23.

Delgado, I. (1984). La alfalfa en pastoreo. In: *Cultivo de la Alfalfa en los Regadíos del Duero y Ebro*, Servicio de Extensión Agraria (ed.). MAPA, Madrid, Spain, pp. 45-59.

Delgado, I., Ramón, J. and Valderrábano, J. (1992). Efecto del pastoreo directo sobre un cultivo de alfalfa. *Investigación Agraria: Producción y Sanidad Animal*, 7(1): 71-80.

Fanlo, R., Chocarro, C., Intini, M. and Lloveras, J. (1999). Efecto del pastoreo invernal sobre la produccion y calidad de las alfalfa de regadío. In: *Actas de la XXXIX Reunión Científica de la Sociedad Española para el Estudio de los Pastos,* Almería (Spain), pp. 203-207.

Wynn-Williams, R., Rea, M. and Purves, R. (1991). Influence of winter treating on lucerne growth and survival. *New Zealand J. of Agricultural Research,* 34: 271-275.