

# PASTURE ATTRIBUTES AND LIVE-WEIGHT GAIN OF LAMBS GRAZING WITH DIFFERENT SUPPLEMENTATION LEVELS

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## ABSTRACT

The purpose of this study was to determine pasture attributes, live-weight gain and stocking rate from a mixed pasture grazed by lambs receiving different supplementation levels. There were four treatments: in two, lambs grazed at 4 or 8% herbage allowance, no supplement; in the other two, lambs grazed at 4% herbage allowance plus a concentrate to cover 25 and 30 or 50 and 60% of estimated daily needs of metabolizable energy and crude protein. Pasture was of perennial and annual ryegrass, orchard grass and red clover. Pre and postgrazing forage mass, crude protein and dead material were not different ( $P > .05$ ) among treatments. The highest live-weight gain was 145g/lamb/day found in lambs receiving concentrate. Stocking rate was 56 lambs/ha in 4% allowance-treatments and 29 lambs/ha with 8% allowance. Supplementation did not influence pasture attributes while giving higher live-weight gain in lambs. Doubling herbage allowance gave lower lamb performance than offering a concentrate and decreased stocking rate.

## INTRODUCTION

On temperate pastures lamb live-weight gain on per lamb basis can be improved by increasing herbage allowance as long as no dead plant material is accumulated (Guillen *et al.*, 1990). However, if forage yield is kept the same, stocking rate falls along with live-weight gain on a per hectare basis (Dominguez and Apodaca, 1980). Therefore, achieving maximum live-weight gain on per lamb basis cannot be obtained at the same time as maximum live-weight gain per hectare.

Offering a concentrate to grazing lambs has been suggested to improve lamb live-weight gain on per lamb basis while maintaining stocking rate (Orcasberro & Fernandez, 1982) but amount given and quality of the concentrate might influence extent of forage intake by lambs (Golding *et al.*, 1976) which in turn might change actual grazing pressure and then regrowth pattern of pasture (Solano & Coronado, 1979).

The objective of the study was to determine pasture attributes, live-weight gain and stocking rate when grazing lambs were offered concentrate or higher daily herbage allowance.

## METHODS

Four treatments were evaluated, in two treatments lambs were not offered any concentrate, lambs grazed at 4 or 8% daily herbage allowance. In the other two treatments lambs grazed at 4% daily herbage allowance and were offered one of two levels of supplementation: low (LS) or high (HS). LS provided 25 and 30 and HS provided 50 and 60% of the estimated daily needs of metabolizable energy and crude protein, respectively. Concentrate had the same composition, was based on corn and soybean meal, and was given in different amounts to match the desired level of supplementation.

A total of 48 crossbred lambs (SuffolkXRambouillet) six months old and mean initial weight of 22.8 kg were used. Lambs were grouped in fours and randomly assigned to a pasture.

Grazing lasted 84 days; rotational grazing with 7 and 56 days of grazing and rest was followed. Lambs were on pasture 10 hours a day and penned for the rest of the day, water was offered in pens, concentrate was given on a daily basis while on pasture.

Experimental design was a complete random with three replicates. Experimental unit was the pasture area grazed by a group of four lambs in the 84 days that the field work lasted. Area of each grazing strip was determined based on pregrazing forage mass and lamb's live-weight recorded every two grazing strips (14-day interval).

Pasture measurements in each grazing strip were pre and postgrazing forage mass, dead material and crude protein content. Analyses of variance were conducted on pregrazing measurements of the regrowth, while in postgrazing measurements both first growth and regrowth were analyzed. Analyses of each moment were done independently from each other, under a split-plot design. Main plot was treatments and sub-plot the specific grazing strip.

Lamb measurements were average daily live-weight gain and seasonal stocking rate. Both variables were subjected to respective analysis of variance.

## RESULTS AND DISCUSSION

None of the pasture attributes measured were different ( $P > .05$ ) among treatments (Table 1). Mean pregrazing forage mass was 2,900 kg/ha. Similar pregrazing forage mass across all treatments might be explained on basis of the rather long resting period. In addition to the fact that there were no differences among treatments in postgrazing forage mass, which might yield a similar pasture regrowth pattern. Protein content in pregrazing forage mass was rather low for this type of pasture pointing out that the rest period was too long. However, dead material in pre and postgrazing forage mass were not higher at 8% allowance as might be expected due to higher forage mass on offer for each grazing lamb.

Extent of animal effects of grazing lambs on pasture attributes were not influenced by increasing daily herbage allowance from 4 to 8%, nor by increasing concentrate to cover up to 50% of the estimated daily need for metabolizable energy. These results are difficult to explain.

Lamb daily live-weight gain and stocking rate were different ( $P < .05$ ) among treatments (Table 2). The highest daily gain was 145 g/lamb found in both treatments where lambs were offered concentrate, the lowest was 66 g/lamb found at 4% allowance and no supplementation. Stocking rate for the 84 days was the same for all treatments at 4% allowance, and at 8% allowance stocking rate decreased 48%.

From pasture measurements it seemed that forage intake by lambs was similar no matter the daily herbage allowance nor supplementation level. However quality of forage consumed and quality of whole diet (forage+concentrate) might not be the same across all treatments. The higher daily live-weight gain of lambs grazing at 8% rather than at 4% allowance, both with no

supplementation, can be explained on basis of higher quality of the forage consumed at 8% allowance since lambs had a greater opportunity to select the forage consumed. Supplying concentrate to lambs increased diet quality and then higher daily gain than lambs grazing at 8% allowance. Offering a higher degree of selectivity in grazing was not enough to yield a diet of the same quality compared to lambs being offered a concentrate and lower degree of selectivity. On the other hand, doubling daily herbage allowance, from 4 to 8%, gave half the stocking rate and then decreasing live-weight gain from 316 to 280 kg/ha/84 days.

Supplementation of lambs grazing at 4% herbage allowance improved daily live-weight gain per lamb with no change in pasture attributes or stocking rate compared to no supplementation. Increasing herbage allowance up to 8% gave lower daily live-weight gain per lamb, stocking rate and live-weight gain per hectare than offering a supplement with grazing at 4% allowance.

## REFERENCES

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**Table 1**

Characteristics of a temperate mixed pasture grazed by lambs offered different herbage allowance and level of supplementation

| Attribute               | Herbage allowance : supplementation level <sup>1</sup> |       |       |       | CV |
|-------------------------|--|-------|-------|-------|----|
|                         | 8:NS   | 4:NS  | 4:LS  | 4:HS  |    |
| Pregrazing, regrowth    |  |       |       |       |    |
| Forage mass(kg/ha)      | 3124a  | 2601a | 2851a | 3024a | 29 |
| Dead matter(kg/ha)      | 831a   | 540a  | 648a  | 706a  | 42 |
| Protein, %              | 10.6a  | 13.1a | 13.7a | 13.9a | 17 |
| Postgrazing, 1st growth |  |       |       |       |    |
| Forage mass(kg/ha)      | 1761a  | 1575a | 1942a | 1952a | 29 |
| Dead matter(kg/ha)      | 360a   | 313a  | 378a  | 343a  | 49 |
| Protein, %              | 7.0a   | 7.0a  | 8.2a  | 7.9a  | 25 |
| Postgrazing, regrowth   |  |       |       |       |    |
| Forage mass(kg/ha)      | 1137a  | 1339a | 1597a | 1582a | 38 |
| Dead matter(kg/ha)      | 522a   | 624a  | 639a  | 592a  | 33 |
| Protein, %              | 8.7a   | 10.3a | 10.6a | 10.4a | 27 |

<sup>1</sup>Herbage allowance in percent, NS= no supplement, LS= low level of supplementation, HS= high level of supplementation.

**Table 2**

Live-weight gain of lambs and stocking rate from a mixed temperate pasture grazed at different herbage allowance and supplementation level

|                                | Herbage allowance : supplementation level <sup>1</sup> |       |       |       | CV |
|--------------------------------|--|-------|-------|-------|----|
|                                | 8:NS   | 4:NS  | 4:LS  | 4:HS  |    |
| Weight gain g/day/lamb         | 115b   | 66c   | 142a  | 147a  | 11 |
| Stocking rate lambs/ha/84 days | 29.2b  | 57.0a | 57.8a | 53.4a | 12 |

<sup>1</sup> Herbage allowance in percent, NS= no supplementation, LS= low level of supplementation, HS= high level of supplementation.