FREQUENCY OF FEEDING LUPIN GRAIN SUPPLEMENTS TO LAMBING EWES GRAZING WHEAT STUBBLE

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SUMMARY

Lupin grain supplements were broadcast at 3-4, 7, 14 and 21 day intervals to autumn lambing ewes grazing a wheat stubble during a 110 day period starting 42 days before lambing. The ewes each produced and reared a single lamb. Before lambing the ewes fed at the two longer intervals gained 1.0-l-3 kg more weight than the two most frequently fed groups (p(0.05). Nutritional status one week prior to lambing, as indicated by a lower plasma 3-hydroxybutrate level, was significantly better in the ewes fed at 14 day intervals (0.7 mmol/l) compared with those fed at the 3-4 day interval (0.9 mmol/l). During lactation there was a small, nonsignificant trend towards greater liveweight loss in ewes fed less frequently. There was no effect of interval on lamb growth rates during the first 2 months of life. Wool growth, mean fibre diameter and mean staple strength were not significantly affected by altering the time interval between feeding.

Keywords: frequency of feeding, lambing ewes, lupins

INTRODUCTION

Reducing the frequency of feeding supplements to lambing ewes is attractive because of the lower labour costs and a greater potential for the poorer animals in the flock to get some of the supplement (Allden 1981). Weekly feeding of a lupin grain supplement compared with more frequent feeding did not affect liveweight change of weaners (Hawthorne and Stacey 1984). Extending this interval to four weeks ,with sheep grazing a wheat stubble, caused a variation in supplement intake which resulted in a fluctuation in liveweight (Rowe and Ferguson 1986).

Large variations in the energy intake by pregnant ewes may increase their susceptibility to pregnancy toxaemia (Kronfeld 1972), reduce the growth of the foetus (Mellor 1983) and limit milk production (Treacher 1983). This paper reports the effects of increasing the time interval between broadcasting a lupin grain supplement on liveweight change and wool production by lambing ewes and on the birthweight and early growth rate of their lambs.

MATERIAL AND METHODS

Four treatments - the different periods of time between feeds - 3-4, 7, 14 and 21 days,were replicated twice in randomized blocks. The eight, 2-hectare plots were sited in a wheat stubble which had yielded 2.4 t/ha of grain at harvest in December 1985. These plots were pre-grazed with both experimental and some additional sheep at a rate of 20 sheep/ha for 2 weeks prior to starting supplementary feeding on 21 February.

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Experimental animals

A flock of 340, 2.5 year old Merino ewes, were joined with 34 rams for 7 days from 5 November 1985 following the synchronization of oestrus with Repromap R intra-vaginal sponges. One hundred and eleven ewes bearing a single foetus identified by real time ultrasound, were weighed, stratified by weight and allocated systematically from the weight strata into eight groups of 13 ewes. The ewes were placed on their plots on 6 February, removed on 11 June and run together on pasture until shearing on 4 November. Seven sheep were retained as spares to replace ewes which did not lamb or which did not successfully rear a lamb.

Lupin supplements

The lupin grain was broadcast out to the sheep from a seed spreader at a density of 10-30 g of seed/m^2. In the period 21 February to 7 March the average rate of supplementation was 150 g/hd/day. This was increased to 250 g/hd/day on 7 March, to 350 g/hd/day at the commencement of lambing on 4 April, and to 400 g/hd/day in the period 30 May to 11 June.

Measurements

The ewes were weighed weekly and their fleeces, grown over 305 days, were weighed at shearing. The lambs were weighed at birth and thereafter, weekly. Wool growth was delineated by dye bands applied at the start of feeding, on 23 April - 9 days after the last lamb was born - and at the termination of feeding. Mid-side wool samples were removed prior to shearing on 1 October and measurements made of yield, mean fibre diameter, staple strength and position of break (Ralph 1984). Blood samples were collected from the ewes 1 week prior to lambing and analysed for 3-hydroxybutyrate (McMurray 1984).

The dry matter available to the sheep prior to feeding and at parturition was estimated by cutting, drying and weighing ten, 40 x 90 cm quadrats per plot. The material from the second cutting was analysed for in-vitro digestibility (IVD) and nitrogen (N). The rate of consumption of the lupin grain was estimated by counting the number of grains in twenty, 40 x 90 cm quadrats per plot at 3-4 day intervals after feeding until more than 90% of the grain had disappeared. Differences between treatments were examined by analysis of the variance of the plot means. The analysis of the lamb birthweights was adjusted for number of lambs per plot and sex of the lamb.

RESULTS

The liveweight changes of the ewes are presented in Table 1. Weight gain pre-lambing was greater in the sheep fed at 2 and 3 week intervals than in the sheep fed more frequently ($p<0.05$). Weight loss during lactation did not differ significantly between treatments although there was a consistent trend towards greater weight loss as the interval between feeds was increased.

The results of the measurements of wool growth and fibre characteristicsare presented in Table 2. The range in the length of wool grown-each day during the 76 days pre and immediately post lambing was 0.197-0.201 mm/day. In lactation, the range was 0.206-0.214 mm/day. The weakest point in the staple was located predominantly in the wool grown during lactation (66-83% of breaks).

The birthweight and the growth rate of the lambs from birth to the termination of feeding are presented in Table 3. There were no significant differences between the treatments.

Table 1 The mean liveweight at the start of feeding, the mean plasma 3-hydroxybutyrate levels measured 1 week prior to the commencement of lambing, and the liveweight changes prelambing and during lactation in ewes fed a lupin supplement at different time intervals

Time interval between feeds (days)	Liveweight at the start of feeding (kg)	Liveweight change during 35 days up to 1 week pre-lambing (kg)	3-hydroxy-butyrate levels one week prior to lambing (mmol/l)	Liveweight change during 56 days of lactation (kg)
3-4	47.6	1.6	0.9	-4.6
7	48.9	1.4	0.9	-5.2
14	48.0	2.4	0.7	-5.4
21	47.9	2.7	0.7	-5.8
LSD ($p<0.05$)		0.78	0.19	1.3

Table 2 Clean weight, fibre diameter and staple strength of wool grown by ewes fed a lupin supplement at different intervals of time

Time interval between feeds (days)	Clean wool weight (kg)	Mean fibre diameter (μm)	Staple breaking force (N/Ktex)
3-4	2.73	20.7	27.3
7	2.54	20.5	27.2
14	2.64	21.0	29.1
21	2.75	21.0	29.7

Table 3 Mean birthweight of male and female lambs and the combined growth rates from birth to the termination of feeding

Length of time between feeds (days)	Birthweight of male lambs (kg)	Birthweight of female lambs (kg)	Growth rate of lambs (g/hd/d)
3-4	4.0	3.7	173
7	4.1	3.8	175
14	4.6	3.9	162
21	4.5	3.9	175
LSD ($p<0.05$)	0.8	0.5	16

The quantity of stubble at the start of feeding (21 February) was 4.2 + 1.6 t/ha which was reduced to 2.4 $\pm$ 0.6 t/ha (41% IVD; 0.37% N) by 4 April. On 21-22 February there was a fall of 65 mm of rain. A small amount of green feed was available to the sheep for about 2-3 weeks. The next fall sufficient to cause a germination occurred on 14 May.

The rate of disappearance of the broadcast lupin grain was a function of the quantity of grain present and the month in which it was measured. In March this rate was expressed by the equation $RM = 3.7 + 0.15 L$ ($r^2 = 0.88$) where RM = the rate of disappearance of lupin grain in g/hd/d, measured in March, and L = quantity of lupin grain present in g/hd. In April this rate, RA, was expressed as $RA = 174.3 + 0.12 L$ ($r^2 = 0.74$). While the two equations have similar slopes, the constant differs ($p<0.001$). The prolonged period of wet weather in May caused the germination of a small proportion of the lupin grain and reduced its rate of disappearance.

DISCUSSION

Less frequent feeding of the ewes (14 day and 21 day intervals) pre-lambing resulted in a small increase in liveweight and lower plasma 3-hydroxybutyrate levels one week pre-lambing. Therefore there was less risk of pregnancy toxaemia (Russel et al. 1977) occurring' in these ewes compared with the ewes fed more frequently. The time at which these measurements were made may have given some bias to the longer feeding intervals because the ewes in these groups had received 1.75 kg/ewe more lupins at this time. There was a trend towards heavier birthweights of both male and female lambs with less frequent feeding of the ewes.

Prior to lambing, the nutritional status of the ewes was improved by a small but significant degree when the interval between broadcasting of the lupin supplement was increased. This suggests a better utilization of the supplement. Therefore it is possible to extend safely the interval with ewes carrying twins, as long as they have access to unlimited quantities of stubble. Obviously the rate of feeding will need to be increased as the nutritional requirement of the ewes increases and if weather conditions deteriorate. Therefore the practical limitation on the length of time between feeds will be one or two weeks.

The major advantage of a longer interval between feeds for autumn-early winter lambing is its lower labour requirement during the labour intensive, crop sowing period. Another advantage is that, in combination with broadcasting, there will be less disturbance to the lambing ewes. Trailing grain supplements in commercial flocks may cause the ewes to temporarily abandon their lambs (P. Morcombe pers. obs.) which could disrupt the ewe-lamb bond, increasing the likelihood of mismothering and starvation (Alexander 1980). While broadcasting the lupin supplement reduces the daily variation in grain intake (Rowe and Ferguson 19841, we found that the rate of consumption was dependent on the amount fed and the nutritional needs of the ewe.

ACKNOWLEDGEMENTS

This work was supported by a grant from the Regional Extension and Research Fund. Thanks to the staff of the Wongan Hills Research Station for their assistance in the conduct of this trial and to Mrs R. Bradley and Mr M. Ellis for the detailed measurements on the wool samples.

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