EFFECTS OF DAILY OR INFREQUENT SUPPLEMENTATION OF WEANER SHEEP ON LIVESTOCK CHANGE AND WOOL GROWTH

F. FREDERICKS, R.M. DIXON, J.H.G. HOLMES and A.R. EGAN

SUMMARY

One hundred and twenty-three weaner Merino wethers grazing mature grass pasture were used in an experiment to examine the effects of various supplements on liveweight change and wool production. The control group of 23 sheep did not receive supplements. Sheep receiving supplements were given each day in treatment groups of 10 sheep 150 g/sheep/d of oat grain (Oxl), triticale grain (Txl), lupin grain (Lxl), sunflower meal (SMxl) or formaldehyde treated sunflower meal (FSMxl) or 450 g/sheep each third day of the same supplements (Ox3, Tx3, Lx3, SMx3, FSMx3). Supplements were given over a period of 90 d. During the 51 d period before the onset of seasonal rains sheep not receiving supplements lost 22 g/d liveweight. Sheep given Oxl and Txl maintained liveweight (-1 and 3 g/d), while those given Ox3 and Tx3 gained weight (25 and 17 g/d, respectively). Liveweight gains of 12 to 36 g/d were observed with the three supplements of high protein content. Wool growth was increased ($P<0.05$) by all supplements except Oxl, and the response was greatest with a 50% increase for the FSM given either daily or each 3 d. No differences ($P>0.05$) in liveweight were observed among the treatment groups 28 d after supplementation was terminated. (Keywords: grazing sheep, supplements, supplementation frequency).

INTRODUCTION

One consequence of a seasonal pasture production cycle involving summer droughts is that for three to six months the pasture available to grazing animals consists of dead plant material of low digestibility and low nitrogen content. Lambs born during the winter when green feed is available and grazed on low-quality pastures after weaning have depressed growth rates and wool production (Allien 1982). One management strategy to alleviate such reduced production is to provide concentrate supplements containing additional digestible energy and protein. The cost benefits of supplement feeding are questionable in the face of later recovery by the animal, but if greater efficiency can be achieved in utilisation of supplement and pasture, benefits may be achieved.

An experiment was conducted to examine the effects of supplements of cereal grains, lupin grain or oilseed meals given under two management systems on the liveweight gain and wool growth of weaner lambs grazing native pasture during and immediately after the dry season.

MATERIALS AND METHODS

The experiment was conducted at The University of Melbourne Experiment Station "Strathfieldsaye", Bairnsdale, Vic. One hundred and twenty-three weaner Merino wethers born in May and June of 1984 were selected for uniformity of liveweight. Throughout the experiment, commencing on 20 December 1984, the sheep were grazed as a single flock in a 6 ha experimental paddock of native pasture. Each day during an initial adaptation period the sheep were yarded and given, in troughs in a large pen, 50 g/sheep of whole barley grain. On 10 January 1985, sheep were allocated at random to each of eleven experimental treatments with different supplements fed in the same yarding system and measurements were commenced.

Twenty-three sheep were allocated to the control group which did not receive...
supplements. Five treatments consisted of 150 g (air-dry)/sheep of supplements given to the sheep each day; these supplements were oat grain (Oxl), triticale grain (Txl), lupin grain (Lxl), sunflower seed meal (SMxl) and formaldehyde treated sunflower seed meal (FSMxl). Five further treatments consisted of 450 g (air-dry)/sheep of the same supplements given to the sheep each third day (Ox3, Tx3, Lx3, SMx3 and FSMx3). All sheep were yarded each day and were given the supplements in group pens. Formaldehyde treatment of the sunflower meal was carried out by spraying formaldehyde solution (3.63 g formaldehyde/kg air-dry sunflower meal) over the feed while it was being mixed in a horizontal feed mixer, and then storing the material for at least 7 d in plastic bags before use.

Table 1 Liveweight change and wool growth of sheep grazing pasture and given various supplements

<table>
<thead>
<tr>
<th></th>
<th>Initial LW (kg)</th>
<th>Change from initial LW</th>
<th>Wool Growth (mg/d)</th>
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<tbody>
<tr>
<td></td>
<td>n</td>
<td>10/1</td>
<td>27/2</td>
</tr>
<tr>
<td>Control</td>
<td>23</td>
<td>27.4</td>
<td>-22</td>
</tr>
<tr>
<td>Ox1</td>
<td>10</td>
<td>26.4</td>
<td>1b</td>
</tr>
<tr>
<td>Ox3</td>
<td>8</td>
<td>27.2</td>
<td>2b</td>
</tr>
<tr>
<td>Tx1</td>
<td>10</td>
<td>26.9</td>
<td>3b</td>
</tr>
<tr>
<td>Lx1</td>
<td>10</td>
<td>26.1</td>
<td>17bc</td>
</tr>
<tr>
<td>Lx3</td>
<td>10</td>
<td>26.9</td>
<td>14bc</td>
</tr>
<tr>
<td>SMx1</td>
<td>10</td>
<td>26.9</td>
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<tr>
<td>SMx3</td>
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<td>FSMx3</td>
<td>10</td>
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<td>36b</td>
</tr>
<tr>
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<td>-0.07</td>
<td>10.2</td>
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<tr>
<td>Significance</td>
<td>** NS</td>
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<td>** NS</td>
</tr>
</tbody>
</table>

Clean wool growth was measured by clipping mid-side patches (100 mm x 100 mm) on 6 February and 2 April, and scouring the sampled wool. Sheep were weighed on the day after feeding supplements to the sheep given supplements each third day.

Supplementation was continued until 15 April (i.e. 90 d). Rains from 16 March resulted in some green pasture on offer during the last several weeks of supplementation, but all sheep continued to consume all of the offered supplements. Liveweight measurements were continued until 13 May (i.e. 118 d). Pasture quadrats were cut at approximately 14 d intervals during the experiment.

Liveweight change during the first 51 d of the experiment was calculated by linear regression of live weight on time. Since all sheep initially lost weight at the onset of the rains, it was considered inappropriate to calculate live-weight change by regression for the entire experimental period; liveweight change at individual weighing days after the onset of rains were compared independently.

For initial live weight, liveweight change and wool growth, means of treatments were compared using one-way analysis of variance, and means were separated into their respective classes using the Student-Neuman-Keuls range test.

RESULTS

The nitrogen content of available pasture ranged from 8.6 to 10.6 g N/kg DM during the period from 15 January to 16 March, but was greater (15.7 g N/kg DM)
on 10 April.

The results for change in live weight at various dates and liveweight change during the first 51 d of supplementation are given in Table 1. The Control sheep lost 22 g/d live weight during the first 51 d of the experiment, and all supplementation treatments resulted in an improvement ($P<0.05$) in liveweight change. Sheep given oat grain or triticale grain daily (Ox1 and Tx1) maintained live weight (-1 and 3 g/d, respectively) but when these supplements were given once each third day, liveweight change was improved (25 and 17 g/d, respectively). Although not significantly greater ($P>0.05$) according to the range test, when these four treatments were considered independently there was an increase ($P<0.05$) in liveweight change due to giving oat or triticale grain supplements each third day rather than daily.

The liveweight change was increased by the two protein supplements, the greatest increases occurring with sunflower meal given each third day (SMx3, 26 g/d) and for formaldehyde treated sunflower meal given daily (FSMx1, 36 g/d). The effects of lupin grain supplements was intermediate (14 g/d), and was not influenced by the frequency of feeding of the lupin grain.

Liveweight change of the sheep was not different ($P>0.05$) among treatments receiving supplements at the various times at which they were weighed after the onset of rains. Twenty-eight days after the supplementation was terminated there was no residual significant effect of supplementation ($P>0.05$) on liveweight change.

Wool growth was increased ($P<0.05$) by all of the supplements except oat grain and triticale grain given daily. Frequency of feeding the supplements of high protein content did not affect ($P>0.05$) wool growth. Wool growth was increased by 27% by the lupin grain supplements, 34% by the sunflower meal and 50% by the formaldehyde treated sunflower meal. Wool growth was correlated ($r=0.79$, $P<0.01$) with liveweight change of the sheep.

**DISCUSSION**

The effect of supplements on liveweight gain and wool growth of these weaner sheep grazing mature pastures is in agreement with a number of similar studies (with weaner sheep) (Hodge and Bogdanovic 1984; Freer et al. 1985) and ewes (Kenney and Roberts 1984).

The oat and triticale cereal grains were utilised more effectively for liveweight gain when given every third day rather than each day; with the former management strategy the sheep gained live weight during the first 51 d of supplementation (17 and 25 g/d) whereas with the latter strategy the sheep barely maintained live weight (-1 and 3 g/d). Similar differences were also observed in wool production where wool growth rate was increased by 6% with daily feeding and by 27% with feeding each third day. These results suggest that feeding the cereal grains each third day was associated with a lower substitution of supplements for pasture intake.

The supplements of high protein content given daily or each third day were effective in increasing liveweight gain during the first 51 d of supplementation (12 to 36 g/d), but were no more effective than the cereal grain supplements given each third day. The absence of a consistent effect associated with the frequency of feeding is in agreement with the studies of Hennessy (1981) with a mixed protein meal and Hawthorne and Stacey (1984) with lupin grain.

Wool growth is primarily limited by the supply of sulphur amino acids (Reis and Schinckel 1961). Formaldehyde treatment of protein meals may decrease the
extent of their degradation in the rumen and hence increase the supply of amino acids absorbed from the small intestine (Ferguson 1975). The tendency for wool growth to be increased by the supplements of high protein content and to be increased by the formaldehyde treatment of the sunflower meal suggests that these treatments did increase the flow of protein to the small intestine and hence increase the absorption of amino acids.

REFERENCES


