PRODUCTION FEEDING OF WEANER LAMBS WITH DIETS BASED ON WHEAT, - EFFECT OF DIETS AND MANAGEMENT

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Summary

Two groups each of 117 lambs were introduced to a wheat diet and a similar group to a wheat/hay diet over 19 days. Lambs which were losing liveweight in the first 40 days (culls) were removed from one wheat diet group and fed a wheat/hay diet.

A regression of subsequent liveweight change on initial liveweight change within the unselected wheat fed group was significant (P<0.05) but not for this parameter within the wheat/hay fed group.

Mean lamb performance (liveweight gain and feed intake) from the unselected group fed wheat/hay was significantly greater than performance from lambs fed whole wheat. When the culls were removed from a whole wheat diet lamb performance was significantly greater than an unselected wheat fed group. These culls performed well when fed a wheat/hay diet.

I. INTRODUCTION

Production feeding of weaner lambs on high grain diets offers the producer an alternative method for finishing lambs during drought or seasonal pasture shortages (Romberg, Pearce and Tribe 1970; Saville et al. 1973). Whole wheat is easy to store and handle with equipment generally available on wheat/sheep farms, but this diet has shown to be unsatisfactory for lambs unless sodium supplement is offered (Saville et al. 1973). A high variability in performance is common when high concentrate diets are fed to ruminants (Andrews, Kay and Ørskov 1969). In pen studies, initial poor performers are often culled before measurements are made (Weston 1974) and this may limit the extrapolation of experimental results to the field situation. If these animals could be identified early and selectively fed, the performance on concentrate diets may be increased in the practical situation.

Pen studies (Davis, unpublished data) have shown that liveweight gain is greater when 20% hammermilled lucerne is mixed with wheat compared with whole wheat. Production differences between whole wheat and wheat/hay need to be quantified under group feeding conditions before a choice between these diets can be made.

In this experiment whole wheat and wheat/hay diets were compared for group feeding and the value of transferring the initially poor performing wheat-fed lambs to a wheat/hay diet was investigated.

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II. MATERIALS AND METHODS

Three hundred and fifty mixed sex, Merino Border Leicester (88-94%) backcross lambs with an initial age of 69-91 days and an initial live weight of 20.2 (± S.D. 5.2) kg were used. Three groups, each of 116-117 lambs were selected by stratified randomization based on sex and live weight and placed in 223 m² yards with feed troughs providing 12.5 cm, space lamb⁻¹. Water was available ad lib.

Lambs were introduced to wheat or wheat/hay diets over a 19 day period by commencing with approximately 1 kg long lucerne hay lamb⁻¹ day⁻¹ for the first four days then increasing the amount of grain by 50 g lamb⁻¹ every second day with a concurrent reduction in the amount of hay fed. By the sixth day it became obvious that the lambs would not accept wheat so the grain was fed as 50% oats/50% wheat for the next eight days, then the oats was phased out. The lambs readily accepted oats and this was probably related to previous experience.

The wheat diet was then fed ad lib. to two groups and the wheat hay to one group. Diet composition is shown in Table 1.

<table>
<thead>
<tr>
<th>Component (air dry basis)</th>
<th>Wheat</th>
<th>Wheat/hay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>97.0</td>
<td>73.6</td>
</tr>
<tr>
<td>Hammermilled lucerne hay</td>
<td>0</td>
<td>20.0</td>
</tr>
<tr>
<td>Meat meal</td>
<td>0</td>
<td>6.4</td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>1.5</td>
<td>0</td>
</tr>
<tr>
<td>Calcium carbonate</td>
<td>1.5</td>
<td>0</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>1.89</td>
<td>2.24</td>
</tr>
<tr>
<td>Dry matter</td>
<td>88.0</td>
<td>86.3</td>
</tr>
</tbody>
</table>

Liveweight change over the 19 day introductory period plus the first 21 days on a wheat diet was measured. In one wheat group lambs which lost liveweight over this 40 day period (culls) were removed and fed the wheat/hay diet as a separate group.

The experiment continued for a further two periods each of 56 days and a final period of 44 days. Lambs were weighed and feed intakes measured every 14 days after the introductory test period and feed conversion efficiency calculated. At the end of each period the groups which had reached approximately 38 kg mean live weight were slaughtered as well as half the remaining lambs in each of the other groups. Dressing percentage was calculated as cold carcass weight expressed as a percentage of unfasted live weight.

The data were analysed by two way analysis of variance using replication in time (14 days) within each post introductory period. Regression analysis was used to determine relationship between subsequent and initial liveweight change.

III. RESULTS

(a) Effects of diet and management (Table 2)

Unselected lambs fed the wheat/hay diet gained significantly greater liveweight than both the unselected and the selected (i.e. with culls...
removed) groups fed wheat only. This was associated with a significantly greater intake but not feed conversion efficiency.

When lambs which were losing liveweight during the introductory test period were culled from the group, mean liveweight gain of the remaining lambs was significantly higher than the mean for the unselected wheat fed group during periods I and II. Feed intake was significantly higher in period I and food conversion efficiency in period II.

TABLE 2

Effect of management and dietary treatments on lamb performance over experimental periods

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Unselected groups</th>
<th>Selected groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wheat only</td>
<td>Wheat/hay</td>
</tr>
<tr>
<td>Liveweight gain</td>
<td>2.5b</td>
<td>4.9b</td>
</tr>
<tr>
<td>No. of lambs</td>
<td>99</td>
<td>100</td>
</tr>
<tr>
<td>Period I (56 days) 6.8% deaths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liveweight gain</td>
<td>108.6a</td>
<td>240.2c</td>
</tr>
<tr>
<td>Feed intake</td>
<td>687.5a</td>
<td>1074.8c</td>
</tr>
<tr>
<td>F.C.E. %</td>
<td>15.4a</td>
<td>22.3a</td>
</tr>
<tr>
<td>No. of lambs</td>
<td>99</td>
<td>100</td>
</tr>
<tr>
<td>Period II (56 days) 9.5% deaths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liveweight gain</td>
<td>66.4a</td>
<td>107.3b</td>
</tr>
<tr>
<td>Feed intake</td>
<td>797.6a</td>
<td>821.0a</td>
</tr>
<tr>
<td>F.C.E. %</td>
<td>8.3a</td>
<td>13.1b</td>
</tr>
<tr>
<td>No. of lambs</td>
<td>46</td>
<td>30</td>
</tr>
<tr>
<td>Period III (44 days) 6.5% deaths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liveweight gain</td>
<td>76.6</td>
<td></td>
</tr>
<tr>
<td>Feed intake</td>
<td>609.3</td>
<td></td>
</tr>
<tr>
<td>F.C.E. %</td>
<td>12.6</td>
<td></td>
</tr>
<tr>
<td>No. of lambs</td>
<td>43</td>
<td></td>
</tr>
</tbody>
</table>

1 Liveweight gain and D.M. feed intake (g day⁻¹)
2 Food conversion efficiency % F.C.E. (g gain % feed⁻¹)
3 Means in each row with same superscript do not differ significantly (P<0.05).

Within the unselected wheat group, liveweight gain during the introductory test period was significantly correlated with liveweight gain in period I (r = 0.25, P<0.05). The correlation was not significant for the wheat/hay diet (r = 0.016, N.S.).

Dressing percentage averaged 45.6% and there were no significant differences between any of the treatment groups.

(b) Rainfall and deaths

Rainfall was recorded on 39% of the days (mean 9 mm) which produced unsatisfactory, boggy conditions in the yards. The conditions improved when the area was increased from 2.2 to 4.4 m² lamb⁻¹ on day 31 of period I.
The mortality rate was associated with the wet conditions and there were no management or dietary effects. Deaths occurred mainly with the lighter lambs (t test $P<0.05$) and 43% of these were classed as 'shy feeders' on the basis of a previously recorded liveweight loss of greater than 100 g day$^{-1}$. Post mortem revealed other deaths due to enterotoxaemia, pneumonia and lactic acidosis.

IV. DISCUSSION

Liveweight gain from the unselected grain/hay diet was 220% greater than gain from the unselected wheat diet and food conversion efficiency was 41% greater. Sodium chloride and calcium carbonate (Saville et al. 1973) was added but production differences could have been due to insufficient protein in the wheat diet (Ørskov et al. 1972) as the wheat contained 1.89% N compared with 2.24% N in the wheat/hay diet.

When lambs which were initially performing poorly on a whole wheat diet were selected and removed from the group, the remaining lambs performed better than a comparable unselected wheat fed group. As trough and yard space were adjusted, the results indicate that the remaining lambs were better adapted to the wheat diet. When the cull lambs were offered a wheat/hay diet, performance was equivalent to the unselected wheat/hay group. Regression of subsequent performance on initial performance indicated that selection of culls from a wheat/hay diet would not produce the same magnitude of improvement when compared with a whole wheat diet. Selection of cull lambs on the basis of initial live weight is not indicated as the initial mean live weight of the culls and remaining lambs was not significantly different, however, initial live weight was related to 'shy feeder' deaths.

Data on four methods of production feeding weaner lambs is given; unselected whole wheat and wheat/hay, wheat with culls removed (sold, back to pasture etc.) and a calculated combination of wheat and wheat/hay. In the practical situation, the hay component may be fed separately long rather than milled and mixed, reducing the labour requirements of this method of feeding. Although performance of whole wheat fed lambs is increased when the initially poor performing lambs are removed, performance is inferior to lambs fed wheat/hay diets. The final choice will depend on the relative costs of hay and wheat.

V. ACKNOWLEDGEMENTS

We wish to thank the Australian Meat Research Committee for financial support, Mr C. Walker for conducting post mortem and Mr P. Nichols for assistance with statistical analysis.

VI. REFERENCES