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Supplementary feeding of weaner sheep at Esperance

By Julian Gardner, Veterinary Officer, Esperance and Peter Doyle, Research Officer, Albany

Cereal grains, particularly barley, have been the usual supplement fed to weaner sheep during summer and autumn along Western Australia's south coast. This area is a major barley producer, and weather-damaged and other feed quality grain have a ready use.

High protein lupin seed, and to a lesser extent silage, have gained wide acceptance recently as alternative supplements.

This article discusses the results of the first two of a series of supplementary feeding experiments at Esperance Downs Research Station.

The objectives were to evaluate the liveweight and wool growth of weaners grazing dry annual pasture when supplemented with lupins, barley or silage, and the effects of supplementation on the use of dry pasture residues.

Results show that weaners grazing dry annual pastures on the south coast maintained body weight better when fed lupin seed rather than barley or silage.

Wool production also increased, but the additional wool grown in summer and autumn can be masked over a 12-month growing period by higher wool growth rates in winter and spring.

Sheep fed small amounts of lupin seed early in summer appear to make better use of the dry pasture than sheep fed barley or silage. As the amount of pasture available falls and its quality deteriorates, it is doubtful whether the benefits of feeding lupins on pasture use are maintained.

In autumn, there may only be small differences between feeding lupins and other supplements. It may be most economical to feed the supplement which is cheapest per unit of energy.
Weaners not fed supplements in the trial made compensatory gains in body weight when grazing green pasture.

Table 1. Liveweight change (g/head/day) of weaner sheep (starting liveweight 29 kg; stocking rate 9.3 weaners per hectare) fed lupin, barley or silage supplements between February 23 and May 12, 1988

<table>
<thead>
<tr>
<th>Energy provided by supplement (MJ/day)</th>
<th>Liveweight change for supplement fed</th>
<th>Nil</th>
<th>Lupins</th>
<th>Barley</th>
<th>Silage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-16</td>
<td>-16</td>
<td>-16</td>
<td>-16</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>-22</td>
<td>-19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>-8</td>
<td>-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>27</td>
<td>13</td>
<td>-10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>59</td>
<td>6</td>
<td>-9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>68</td>
<td>17</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>-16</td>
<td>35</td>
<td>1</td>
<td>-6</td>
<td></td>
</tr>
</tbody>
</table>

1 MJ is equal to 75 g lupins (90% DM), 80 g barley (90% DM) and 487 g silage (20.7% DM).

Liveweights

Weaners born in July 1987 were fed no supplement or five energy levels of lupins, barley or silage for 11 weeks between February 23 and May 12, 1988. At each level of feeding, weaners fed lupins gained more weight than those given barley or silage (Table 1).

Sheep fed no supplement (controls) were almost able to maintain weight, and performed nearly as well as sheep given barley or silage. This indicated that a reasonable amount of quality dry feed was available during this season, although no pasture measurements were taken.

Feeding lupins

In the first four weeks of feeding, there was little difference between various rates of lupin supplementation in their effects on liveweight (Figure 1). We believe this indicates that the small amounts of lupins fed were supplementing the dry pasture and improving its use. However, where more lupins were fed, sheep were eating lupin seed rather than the dry pasture - they were substituting the lupins for the paddock feed.

As the quality of the dry pasture declined, the ability of the lupins to improve its use diminished. The weaners' responses were directly related to the rate of lupins fed.

Feeding lupins, barley or mixtures of the two feeds

Weaners were fed lupins, barley or mixtures of two feeds containing 25 per cent, 50 per cent or 75 per cent lupins. Sheep were fed 150 g of lupins per head per day or 160 g of barley per head per day or mixtures of the two feeds to provide equivalent amounts of energy (1.9 megajoules metabolisable energy per day) from December 14, 1988 to May 4, 1989.

Until March 1, 1989, liveweight change increased as the proportion of lupins in the supplement increased (Table 2). Liveweights of weaners fed only barley were no better than those of weaners fed no supplement. This was consistent with previous studies where sheep were found to need a feeding period of at least 36-38 days to show any response to supplementary feeding.

Figure 1. Effects of feeding different levels of lupins on liveweight of weaner sheep between February and May 1988.
six weeks for high starch grains, such as barley or wheat, before they were able to use them efficiently (Rowe, 1986; Rowe et al. 1989).

After March 1, weaners on all supplements maintained weight (Table 2), while those fed no supplement lost weight. The different responses in liveweight before and after March 1 are the result of differences in the amount and quality of paddock feed available.

At shearing in December 1989, there were no significant differences in body weight between the groups of weaners, because of compensatory weight gains. The extent of compensatory gains (that is whether weaners that lose weight in summer and autumn catch up to those that maintained weight, by the end of the following spring) will depend on the pasture conditions and grazing pressure during winter and spring. In poor years complete catch-up or compensation might not happen.

Wool growth

Average wool production responses of weaners fed lupins, barley or silage between February 28 and May 12, 1988 are shown in Table 3. There were no significant differences between level of supplementation or type of supplement fed on greasy or clean fleece weight or fibre diameter of the 12-month fleece.

The substantial increase in body weight in all groups over winter and spring would have been associated with a rapid increase in wool growth and fibre diameter. This may have masked any differences in the wool growth or fibre diameter that occurred during supplementary feeding in autumn. Wool staple strength was not measured.

Feeding lupins, barley or mixtures of the two feeds

For the 19 weeks from December 14, 1988 to May 4, 1989 weaners were fed lupins, barley or mixtures of the two feeds containing 25 per cent, 50 per cent or 75 per cent lupins. Wool growth rates were greater for supplemented sheep than for un-supplemented sheep (Table 4).

Wool growth rates increased as the proportion of lupins in the supplement increased. Fibre diameter of the wool grown while sheep were fed supplements also increased, and increased further as the proportion of lupins in the supplement increased.

### Table 2. Liveweight change (g/head/day) of weaner sheep (starting liveweight 34 kg, stocking rate 10.7 weaners per hectare) fed lupins (L), barley (B) or mixtures of these supplements between December 14, 1988 and May 4, 1989

<table>
<thead>
<tr>
<th>Supplement*</th>
<th>Liveweight change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dec 14 - Mar 1</td>
</tr>
<tr>
<td>Nil</td>
<td>-22</td>
</tr>
<tr>
<td>Barley (160 g/head/day)</td>
<td>22</td>
</tr>
<tr>
<td>75B 25L</td>
<td>15</td>
</tr>
<tr>
<td>50B 50L</td>
<td>20</td>
</tr>
<tr>
<td>25B 75L</td>
<td>33</td>
</tr>
<tr>
<td>Lupins (150 g/head/day)</td>
<td>38</td>
</tr>
</tbody>
</table>

*All sheep were fed equivalent energy to 150 g lupins.

### Table 3. Average effects on wool production of lupin, barley or silage supplements fed to weaner sheep between February 28 and May 12, 1988

<table>
<thead>
<tr>
<th></th>
<th>Nil</th>
<th>Lupins</th>
<th>Barley</th>
<th>Silage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greasy fleece weight (kg)</td>
<td>4.70</td>
<td>4.98</td>
<td>4.82</td>
<td>4.76</td>
</tr>
<tr>
<td>Clean fleece weight (kg)</td>
<td>3.25</td>
<td>3.43</td>
<td>3.37</td>
<td>3.30</td>
</tr>
<tr>
<td>Fibre diameter (µ)</td>
<td>22.6</td>
<td>22.2</td>
<td>22.6</td>
<td>22.1</td>
</tr>
</tbody>
</table>

Wool growth rates and the fibre diameter of the wool grown in winter and spring while sheep were grazing growing pasture were much greater than in summer and autumn.

Supplementary feeding during the previous dry feed period did not have a carry-over effect on wool growth rates. Differences in the 12-month fleece, therefore, are largely the result of differences in the amount of wool produced in the supplementary feeding period between December and May.

Over 12 months, weaners fed any of the supplements grew more wool than those fed no supplement (Table 5). Sheep fed lupins grew more wool than those given barley or mixtures of barley and lupins. The feeding of all supplements increased staple strength.
Position of the 'break' in the staple

For all sheep the position of the 'break' in the wool staple occurred just before the break of season.

In weaners fed barley we expected this might occur during the first six weeks of feeding, and that staple strength would not be increased greatly for those sheep. This may have happened, but as the sheep were shorn in mid-November before the experiment started, the wool grown during the early part of the experiment may have been in the jaws of the strength testing machine and excluded from the strength evaluation.

A separate experiment at Mount Barker Research Station has indicated that starting to feed supplements at low levels as pasture dries off, usually in November, can improve wool staple strength. Low levels of lupins fed from November 25 resulted in wool with a staple strength greater than 32 Newtons/kilotex. This compared to 24 N/ktx for sheep given no supplement and 23 N/ktx for those given supplements from early February, after the sheep had begun to lose weight. (Thompson and Curtis, 1990).

In our Esperance experiment, wool staple strength improved considerably when supplements were fed from December. This practice will be more important for sheep producing finer wools, which have greater price penalties for staple strength weakness, than broad wool sheep.

Pasture use

During the summer and autumn of 1988-89, the amount of pasture available to sheep declined from 3200 kg dry matter per hectare (DM/ha) on December 14 to only 1900 kg DM/ha on January 25 — a removal rate of 31 kg DM/ha/day.

Weaners were stocked at 10.7 sheep per hectare. They would not have eaten more than 1 kg DM/head/day. Based on this, the estimated consumption of pasture would be only 450 kg of the 1300 kg of dry pasture lost in December-January. The remaining 850 kg was lost from leaf shatter, insect or microbial attack and trampling.
There was hardly any rain during December and January 1988-89, otherwise much more pasture may have disappeared.

Pasture disappearance rates later in the season were much lower, being 13 kg DM/ha/day between January 25 and April 12.

The digestibility of dry pasture also declines rapidly during summer and autumn (Figure 2).

Along the south coast, therefore, it is best to feed sheep supplements that will improve their intake and digestion of dry pasture in early summer, before it loses its quality.

The best method is to feed sheep small amounts of high protein feeds such as lupin seed. As the amount of pasture available and its quality deteriorates, it is doubtful whether the benefits of feeding lupins on pasture use are maintained.
Wool patches were cut to measure growth over given periods.

Hence the objectives of feeding sheep supplements and the choice of supplement should change. For example, it may be more efficient to change to feeding low cost mixes during autumn.

Choice of supplement

Weaner sheep grazing dry annual pastures on the south coast maintained body weight better when fed supplements of lupin seed rather than barley or silage.

Wool production also increased. However, the additional wool grown in summer and autumn can be masked over a 12-month growing period by higher wool growth rates in winter and spring.

The increased wool production during the dry period may be important for staple strength, especially for finer wools which carry a greater penalty for tenderness than broad wools.

Silage or barley were not as good as lupins as a supplementary feed early in summer, when more dry pasture was available and the pasture was more digestible than later in summer. These feeds were probably substituting for pasture rather than adding to the amount of paddock feed eaten.

Silage may be useful at the end of summer when paddock feed is of poor quality and quantity, and as a stored drought reserve for use in poor years.

Further reading


Acknowledgements

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