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B R. Beetson

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FEED FOR

AUTUMN LAMBING EWES

By B. R. Beetson, Research Officer, Sheep and Wool Branch

Department of Agriculture feeding trials with grazing sheep have consistently shown that the level of supplementation should be set for survival and little more, because beyond that the additional costs of supplementary feeding usually outstrip the benefits from extra production.

Even sheep in the greatest need—autumn lambing ewes in late pregnancy and the early part of lactation before and during the break of season—can be fed less than was thought necessary to achieve acceptable production.

In theory, the nutritional requirements of the ewe in the critical period during late pregnancy and the first few weeks of lactation put autumn lambing out of phase with the paddock feed supply. In practice, however, autumn lambing works surprisingly well with only moderate levels of hand feeding.

Reasons for this apparent discrepancy are:

• The calculated nutritional requirements are based on pen feeding experiments and unrealistically high rates of production.

• They do not allow for breakdown and use of the ewe's body fat as an internal supplement to the diet.

• It is difficult to assess the nutrient intakes of sheep grazing sparse and variable pastures in summer and autumn.

Close observations of a large experimental flock of Merino ewes at the Department's Mt Barker Research Station highlighted some further discrepancies.

Mid pregnancy

Even in early pregnancy nutrition cannot be ignored because it influences the ewe's fat reserves which she can draw upon later when nutritional demand is greatest.

Inadequate nutrition can also affect the growth of the placenta, the site for transfer of nutrients to the growing foetus. Placental growth is completed by the 90th day of pregnancy, so that under-nutrition during the third month can reduce the placenta's ultimate size. This in turn can restrict the growth of the foetus in late pregnancy and hence its chances of survival and its growth to adulthood.

Trials at Mt Barker Research Station compared the effects of supplementary feeding of lupin seed and grazing dry summer paddock feed alone on pregnant ewes. Ewes fed 300 g of lupin seed per head per day during the first 100 days of pregnancy maintained their condition, while ewes grazing only dry summer feed lost weight rapidly. The ewes that were under-nourished at this stage of pregnancy produced small placentae, and although they were then fed a high rate of lupins (1.25 kg per head per day) during the latter part of pregnancy, they still failed to produce lambs as heavy as those from the other groups of ewes.

Elsewhere, trials have shown that ewes in good condition can lose weight gradually during the first three months of pregnancy without adverse effects. However, even if ewes are in good condition, abrupt changes in nutrition can have serious detrimental effects during pregnancy because the nutritional demands of the ewe and lamb cannot be met through breakdown of the ewe's tissue.

Late pregnancy

During the final six weeks of pregnancy, the foetus gains 70 per cent of its birth weight, the uterus doubles in size and the udder grows and develops its capacity to produce milk. Ideally, to support these changes, the supply of nutrients to the ewe should increase to 1.75 times what would be needed to maintain a dry ewe.
Severe under-nutrition at this stage can cause immediate, dramatic losses through pregnancy toxoaemia killing both ewes and lambs. Pregnancy toxoaemia usually only affects ewes carrying twin foetuses and then only a small proportion of the flock. Although its commercial significance may be small, the presence of this disease signals that other ewes are probably in great need of supplementary feed. These ewes avoid pregnancy toxoaemia at the expense of the growth of the foetus and development of the udder, and this can lead to greater financial loss than the death of a small number of twin-bearing ewes from pregnancy toxoaemia.

Lambs in such under-nourished flocks do not thrive and may not survive. They have less energy reserves of body fat and glycogen and a weak sucking drive. Often their mothers are slow to supply the energy-rich colostrum which is vital to newborn lambs in the first few hours after birth.

The consequences of mild under-feeding during the last six weeks of pregnancy depend on the body condition of the ewe.

• Thin ewes of body condition scores 2 or less cannot mobilise fat reserves to supplement their diets. They are prone to pregnancy toxoaemia or other less dramatic losses in production.

• Strong ewes of condition scores 2.5 or more can sacrifice their own body tissues to support the growth of foetuses. Although they may have lighter lambs and smaller udders, their overall production is acceptable and excessive hand feeding of these ewes is wasteful.

For example, in 1983 at Mt Barker, 1500 autumn lambing ewes in moderately good condition were hand fed at two rates during the last six weeks of pregnancy: half were supplemented with 400 g of oats and 100 g of lupins per head per day and the other half fed double that rate. The ewes fed the higher rate lost less condition, and grew a little more wool than those fed the lower rate, but their lambs had similar birth weights and survival rates (Table 1).

The following year the same ewes in similar condition were put into three feeding groups during the last five weeks of pregnancy: oats at 310 g per head per day; oats at 670 g per head per day; and lupins at 500 g per head per day. All had access to unlimited poor quality cereal hay. Feed treatment again had no effect on lamb birth weight or survival, indicating that a rate of 310 g was adequate in this situation.

The moderate feeding strategies were commercially better up to lambing than the higher rates. The feeding trials were continued well into lactation to determine whether higher feeding rates would improve lactation and increase growth rates sufficiently to justify the extra expense, but this did not happen.

### Nutrition and lactation

Nutrition influences lactation from before lambing because it is during the final month of pregnancy that the udder grows and the ducts and mammary glands develop. The udder competes for nutrients with the rapidly growing foetus and under-nutrition at this stage can reduce udder size by as much as 45 per cent. The secretory capacity (per unit weight of udder) can be quickly restored if feeding is increased just before lambing, but because the udder is smaller, total milk production is often still low.

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Table 1. Effect of feeding level on birth weight and mortality of lambs

<table>
<thead>
<tr>
<th>Birth type</th>
<th>Feeding level</th>
<th>Lambs born</th>
<th>Birth weight (kg)</th>
<th>Mortality (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>High</td>
<td>470</td>
<td>4.1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>473</td>
<td>3.9</td>
<td>10</td>
</tr>
<tr>
<td>Twin</td>
<td>High</td>
<td>324</td>
<td>3.0</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>281</td>
<td>2.8</td>
<td>34</td>
</tr>
</tbody>
</table>

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If under-nutrition persists beyond lambing, the udder is not only small but produces less colostrum per unit weight. Colostrum is the major source of energy and antibodies for lambs and it must be readily available during the first few hours after birth. If colostrum is restricted at this stage, lambs can quickly exhaust their energy reserves and die from exposure or be more susceptible to diseases.

Even if ewes have been under-nourished throughout pregnancy, their udders can still respond to a boost in nutrition just before lambing, provided the feed supplement has been introduced carefully to avoid digestive upsets and rumen acidosis.

A system which has proved successful at Mt Barker is to give the ewes unlimited hay, further supplemented with about 300 g of oats or lupins per head per day during the final five or six weeks of pregnancy. Good quality hay is best, but even poorer oaten hay is effective.

**After lambing**

After lambing, the ewe’s demand for nutrients increases dramatically (Figure 1), as does her appetite. However, she can make up for some of the shortfall in feed supply by mobilising her own body fat and, to a lesser extent, body protein to produce milk.

Ewes of condition score 2.5 to 3 have a good supply of stored energy and an extra energy supplement may reduce their rate of loss of condition without greatly increasing milk supplies. When the grain supplement to one group of such ewes at Mt Barker was doubled, the net result was only a slight increase in lamb growth rates, but the ewes were 9 kg heavier at weaning. Ewes on the lower rations therefore maintained their milk production at the expense of their own body tissues. After weaning in early spring, these thinner ewes took advantage of the flush of pasture growth and put on weight rapidly, so there was no carry-over effect on the next lambing.

The additional cost of feed for the highly supplemented ewes in the Mt Barker trial was $8.25; little of this was recovered through extra wool and lamb production (Table 2).

Ewes rearing twins benefited most from the extra feed and dry ewes least, but the amount fed was extravagant. There was no advantage in feeding more than 500 g of grain per head per day in these trials.

**Different diets**

Perhaps feeding pregnant ewes other supplementary diets could increase productivity. Hay is known to stimulate milk production and protein increases the conversion efficiency of mobilised fat reserves into milk. If additional roughage and a high protein supplement such as lupin seed were fed, the results might be different.

This was tested in 1984 when three diets were fed to pregnant ewes in moderate condition from five weeks before lambing until four weeks after: oats at 310 g per head per day, oats at 670 g per head per day and lupins at 500 g per head per day. All ewes had free access to round bales of oaten hay.

None of the feed treatments affected lamb survival or growth rate, or wool production of the ewes. The large oat supplement decreased hay consumption—in other words the lowest rate was adequate and most economical.

**Hand feeding strategies**

These trials suggest a way sheep producers can improve profitability through efficient and moderate hand feeding strategies.

The thinnest ewes should be drafted from the main flocks by condition scoring six weeks before lambing begins. These ewes are likely to need most feed. If they are run as a separate flock, they can be introduced to grain supplements immediately without wasting grain on the fatter ewes, which can be introduced to it later.

Research has shown that when ewes are losing weight, a small supplement of protein increases the conversion efficiency of stored body energy to milk.

Lupin seed has a high protein content and is an ideal supplement. The amount needed depends on the condition of the ewes, their stage of pregnancy, the proportion of ewes with twin foetuses, and the amount and quality of the dry paddock feed; so there is no sense in recommending one level and expecting it to apply in all cases. However, the rate should be between 200 and 400 grams of lupin seed per head per day depending on the ewe’s condition and paddock feed.

**Table 2. Loss incurred by doubling the supplement**

<table>
<thead>
<tr>
<th>Lambs reared per ewe</th>
<th>Value of</th>
<th>Extra</th>
<th>Extra wool</th>
<th>Total</th>
<th>Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(kg)</td>
<td>(kg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>$0.81</td>
<td>0.25</td>
<td>0.81</td>
<td>7.44</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>$2.79</td>
<td>0.44</td>
<td>1.43</td>
<td>5.46</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>$3.17</td>
<td>0.47</td>
<td>1.53</td>
<td>5.08</td>
<td></td>
</tr>
</tbody>
</table>

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