# Unpublished Report

| | |
|---|---|
| **Document ID:** | SheepCRC_2_63 |
| **Title:** | Splitting Ewes based on Condition Score and Differentially Feeding |
| **Author:** | Young, J. |
| **Key words:** | sheep; ewe; condition score; nutrition; profitability |

# Splitting Ewes based on Condition Score and Differentially Feeding

John Young
Farming Systems Analysis Service
RMB 309 Kojonup WA 6395.

## *Introduction*

The Lifetime Wool project has developed target condition score (CS) profiles for reproducing ewes based on the production relationships developed in that project. The associated economic analysis (Young *et al*. 2010a) showed that there were reasonable benefits achievable from following the target profiles. A follow-up analysis (Young *et al*. 2010b) examining splitting the ewe flock in mid-pregnancy based on pregnancy status showed that there were further increases in profit possible if the dry, single and twin bearing ewes followed different condition score profiles. This has raised the question whether profit could also be increased by splitting the ewe flock based on CS and differentially feeding the fat and thin ewes.

To be profitable to split the flock and differentially feed the two groups there must be an increase in the value of the products produced or a reduction in the cost of feeding. For this to occur one of three conditions must be met:

1. The relationship between production and CS is curvilinear
2. There is a benefit from reducing the variation in the level of production within the flock.
3. The differential feeding leads to a higher average CS of the flock

Examination of the production relationships developed within LifetimeWool can answer point 1 and feed budgeting can be used to address point 3. Point 2 is a marketing and management issue and will not be addressed further.

If a production relationship is curvilinear then raising the CS of the thin animals - that are on the responsive section of the relationship - at the expense of the fatter animals will increase average production. Curvilinear production relationships have been identified between:

1. Ewe CS and survival of the ewes
2. Ewe CS and peri-natal survival of lambs
3. Liveweight at weaning and survival

All other relationships quantified in the LifetimeWool project showed a linear response to ewe CS. These relationships included progeny CFW, progeny FD, ewe CFW, ewe FD, and ewe reproductive rate. For these linear relationships there would be no benefit from splitting the ewes on CS unless the average condition score of the mob can be increased.

This paper examines

1. the potential increase in profit from utilising the curvilinear relationship identified above and
2. the possibility of increasing average CS through differential feeding of fats and thins

## *Method*

A feed budget varying the level of supplementary feeding was done to examine the possibility of increasing average CS by splitting the ewes on CS and increasing the feed for the thin ewes and reducing the feed for the fat ewes. This was done for a mob with an average CS of 3, the mob was divided in half with one half averaging CS2.5 and the other half CS 3.5. The feed budget was done assuming the ewes were grazing dry pasture residues with a FOO of 1000kg/ha and a dry matter digestibility of 54%. To achieve maintenance the CS2.5 mob required 250 g/hd/d and the CS3.5 mob required 425g/h/d.

The change in LW for each mob and the average was calculated when the rate of supplementary feeding was altered as outline in Table 1. The combination of supplement rates were selected to give the same total amount of supplement fed, but the proportion fed to the thin and fat mob was varied. These combinations are examining the impact on average flock LW on differentially feeding the fat and thin mobs.

**Table 1: The combination of supplementary feeding rates (g/hd/d) for the thin and fat mob that were examined in the feed budgets.**

| CS 2.5 | CS 3.5 |
|---|---|
| 150 | 150 |
| 200 | 100 |
| 250 | 50 |
| 300 | 0 |

The feed budget was done using the equations described in Sheep Explorer (M. Freer *pers comm.*) and these are the equations that underpin Grazfeed and GrassGro.

## *Results & Discussion*

Splitting mobs based on CS and differentially feeding the fats and thins has little or no impact on the average CS of the mob (Table 2). The only impact is if the feeding rate of the thin mob is increased to the point where that mob is gaining weight. At this level of feeding the resulting average condition score of the group of ewes is lower and this occurs because the efficiency of energy use for weight gain is lower than the efficiency of use for maintenance. Analyses done as part of the LifetimeWool project showed that gaining weight by feeding high rates of grain was never a component of the optimum condition score profiles, feeding for maintenance was the highest rate recommended.

**Table 2: Liveweight change (g/hd/d) for the combination of supplementary feeding rates (g/hd/d) for the thin and fat mob that were examined in the feed budgets.**

| Feeding rate (g/hd/d) | Liveweight change (g/hd/d) | | | Ave CS after |
|---|---|---|---|---|
| CS 2.5 – CS 3.5 | CS 2.5 mob | CS 3.5 mob | Average | 30 days |
| 150-150 | -40 | -100 | -70 | 2.79 |
| 200 - 100 | -20 | -120 | -70 | 2.79 |
| 250 - 50 | 0 | -140 | -70 | 2.79 |
| 300 - 0 | +6 | -160 | -77 | 2.77 |

If the feed budgeting underlying these results is correct it indicates that splitting mobs on CS and differentially feeding will not increase flock productivity or profitability if the production relationships are linear. The feed budgeting equations used are from Sheep Explorer (M. Freer *pers. comm.*) and these equations underpin the GrazFeed and GrassGro models which

have been extensively tested across Australia. However, an assumption made in the model and in the feed budget done for this paper is that the fat and thin animals in a mob have the same relationships between liveweight and intake, and liveweight and maintenance requirement. This may not be the case and different animals having different relationships would explain why the CS of the animals in the mob diverged initially. With the assumptions made in this analysis, at the same level of feeding the fatter animals lose more weight than the thin animals (see Table 2, 150-150 feeding rate). Little data is available to chack the assumption but it is backed by data of A. Thompson (*pers. comm.*) from the LifetimeWool experimental flocks (Figure 1).

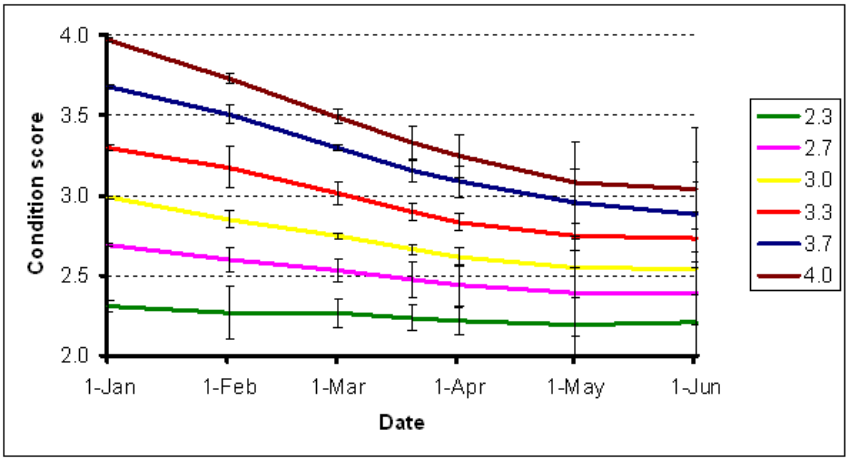


**Figure 1: Condition Score profiles of groups of animals within the LifetimeWool experimental flock in Hamilton Victoria. The animals were run together but allocated to groups depending on CS at 1 January. A Thompson *pers. comm.***

Another plausible reason why the feed budget that has been carried out may not be correct is if the thin animals are shy feeders and when they are in a large mob they consume less feed than if they were separated and fed separately. This is a difficult hypothesis to test but if it is correct then separating a tail could lead to a higher average condition score for the mob. A trial would need to be carried out to quantify the magnitude of the effect.

The curvilinear relationship between ewe CS and lamb survival is part of the reason why splitting ewes on pregnancy status can increase profitability. It is profitable to feed the twin bearing ewes more and have them follow a higher CS profile than the single bearing ewes. This occurs because the survival of the twin born lambs can be increased dramatically by lifting their birth weight a small amount. The same could occur if there are single bearing ewes that will give birth to light lambs that are at risk of high mortality. The feasibility of doing this depends on being able to identify single bearing ewes that will give birth to light lambs without including ewes that will have trouble with dystocia if birth weight is increased.

The curvilinear relationship between ewe CS and ewe survival provides some scope to increase profit by splitting the flock and differentially feeding. The relationship shows a marked increase in mortality when the condition score of the ewes at lambing drops below CS 2. This indicates that removing those ewes that are approaching this level and increasing their allocation of feed to reduce the rate of LW loss will increase profitability. However, the benefits achieved from this will be modest because removing a tail and feeding that group for maintenance rather than allowing weight loss at 50g/hd/d for 1 month leading up to lambing will reduce mortality in the tail by 1-2% depending on initial CS. This equates to a reduction in deaths of 5 ewes in a flock of 3000 ewes.

Our understanding of the animals in the tail of the mob is limited. As outlined earlier, the energy and intake relationship of these animals has not been examined and the reasons that particular animals are thinner than their cohort is also not understood. If the same animals constitute the tail each year then an alternative to differential feeding may be to cull these animals and retain animals that have higher CS and are more productive. However, research in this area is a low priority because the potential returns appear low.

## *Conclusions*

Based on our current understanding there appears to be little benefit of splitting ewes on CS and differentially feeding the groups. However, if farmers need to split their ewe flocks to have manageable mob sizes then splitting on condition score can provide some benefits and there is more reason to split on CS than on age.

There is some uncertainty in the relationships used to carry out the feed budgeting and our understanding of the animals that comprise the tail in the mob is limited. However, research in this area appears to have a low potential return.

## *References*

Campbell, A. – weaner survival relationships reference.

Young, J.M., Thompson, A.T., Oldham, C.M. & Curnow, M. (unpublished(a)). Lifetime Wool: Whole-farm profit is dependent on the live weight profile of ewe flocks through the influence on survival and lifetime wool production of progeny. *Animal Production Science*

Young, J.M., Thompson, A.T., Oldham, C.M. & Curnow, M. (unpublished(b)). Lifetime Wool: Scanning for pregnancy status and litter size and adjusting management can increase wholefarm profit. *Animal Production Science*