

Fat score of ewes at joining: the benefits of optimal nutrition

Dr Sue Hatcher

Senior Research Scientist, Orange Agricultural Institute, Orange

Phil Graham

Livestock Officer (Sheep & Wool), Yass

Sharon Nielsen

Biometrician, Orange Agricultural Institute, Orange

Dr Arthur Gilmour

Principal Research Scientist, Orange Agricultural Institute, Orange

Conception rate increases with increasing fat score and liveweight due to relationships that exist between fat score, liveweight and ovulation rate.

Fat score, liveweight and pregnancy scanning data from joining in both 2004 and 2005 at the three NSW Lifetime Wool Project paddock-scale sites (Southern and Northern Tablelands and Central West Slopes & Plains) were analysed to explore the relationships among these three traits. The aim of the analysis was to answer the following questions:

- What is the relationship between liveweight at joining and the number of foetuses at scanning? How many more lambs am I likely to get if my ewes are heavier at joining?
- What is the relationship between fat score at joining and the number of foetuses at scanning? How many more lambs am I likely to get if my ewes are fatter at joining?
- What is driving this response – more pregnancies or more twins?
- Which is the most important at joining – liveweight or fat score? How do liveweight and fat score together influence the number of foetuses?

- Does a change in liveweight or fat score leading up to joining have an impact on the number of foetuses scanned?
- What is the impact of a previous lambing on a subsequent pregnancy? Are dry ewes consistently dry? Do twin bearing ewes tend to continue to bear twins?

Liveweight at joining and foetuses scanned

Liveweight at joining had a significant impact on the number of foetuses scanned/100 ewes joined across the three NSW Lifetime Wool project sites. Ewes with higher liveweights at joining conceived more foetuses than lighter ewes. The relationship between liveweight at joining and foetuses scanned was linear over the range in liveweight (Figure 1) indicating that for every 5 kg increase in liveweight at joining an additional 8 foetuses were scanned per 100 ewes.

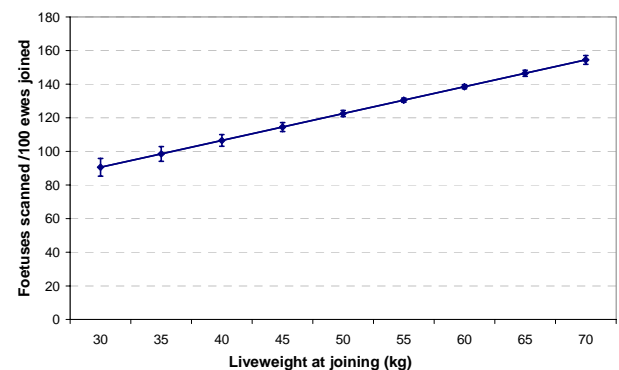


Figure 1: The number of foetuses scanned/100 ewes joined increases linearly with increasing liveweight at joining.

Fat score at joining and fetuses scanned

Fat score at joining also had a significant impact on the number of fetuses scanned *in utero*. Like liveweight, the relationship between fat score at joining and fetuses scanned was linear (Figure 2). For every 1 score increase at joining an additional 12 - 13 fetuses were scanned per 100 ewes (Table 1).

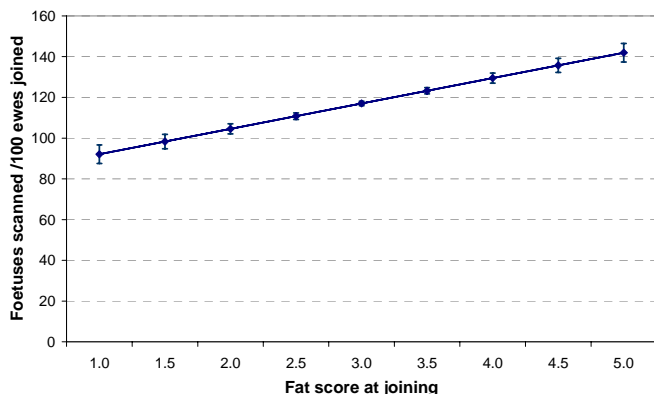


Figure 2: The number of fetuses scanned/100 ewes joined increases linearly with increasing fat score at joining.

However the relative response of an additional 12–13 fetuses for a change of 1 fat score was greater than expected given that 1 fat score generally equates to between 5–7 kg liveweight. So how do we reconcile these two results?

Table 1. Increasing fat score at joining leads to higher number of fetuses scanned *in utero*.

Fat score	Conception rate
1.0	92
1.5	98
2.0	105
2.5	111
3.0	117
3.5	123
4.0	129
4.5	136
5.0	142

The answer lies in the fact that within a flock there will be a range in fat score for a particular liveweight (Figure 3). At a given liveweight every increase of 1 fat score will result in additional 5 fetuses scanned per 100 ewes.

When both the liveweight and fat score relationships with fetuses scanned/100 ewes

joined are taken into account, there is value in drafting the thinner ewes from the mob and giving them preferential nutritional treatment to allow them to increase their fat score prior to joining. Heavier ewes just require maintenance of their fat score.

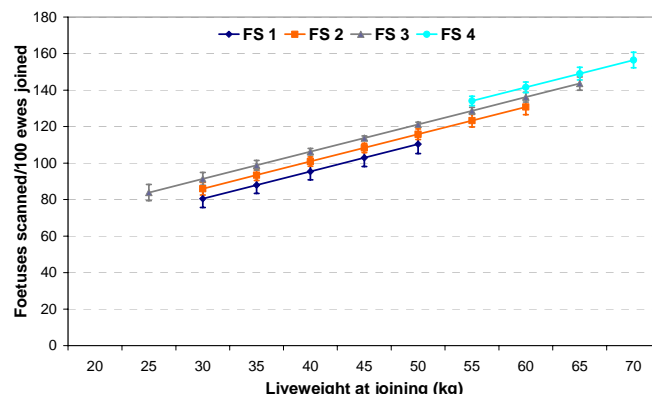


Figure 3: Across all liveweights, an additional 5 fetuses will be scanned by increasing fat score at a given liveweight.

What is driving this response?

The pregnancy scanning information of each ewe was used to calculate the probability of her being dry or having a single or multiple lambs. These probabilities were then used to determine what drives this response – is it less ewes being dry or more ewes having twins or a combination of both?

For the adult ewes at the three NSW Lifetime Wool sites, liveweight at joining had a significant impact on the probability of her either being dry or having a single or multiple lambs (Figure 4). Across all liveweights, the probability of an adult ewe being dry was less than 10%, however, as liveweight at joining increased the probability of a ewe bearing twins increased.

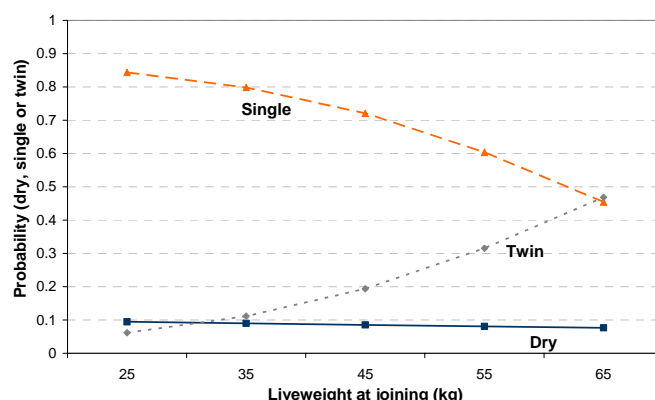


Figure 4: Increased fetuses scanned *in utero* with increasing liveweight at joining of adult ewes is due to a larger proportion of ewes having multiple lambs.

When liveweight is low at joining, say 35 kg, about 80% of ewes will bear a single lamb, 11% will have

twins and 9% will be dry. But as liveweight at joining increases:

- The probability of a ewe being dry tends to stay consistently at 8–9% even at 65 kg.
- The probability of a ewe having a single lamb declines to about 45% at 65 kg.
- The probability of a ewe bearing twins increases to about 47% at 65 kg.

Even at high liveweights, a significant proportion of adult ewes, about 10%, will remain dry. This is most likely due to these ewes being infertile. As a result they were heavier at joining because they did not have the added nutritional pressure of lactation the preceding year.

So the increased number of foetuses scanned *in utero* with increasing liveweight at joining of adult ewes is due to a greater proportion of adult ewes in the flock having multiple lambs.

This was the general trend averaged over the three sites and the two joining periods. However, it is important to note that the probabilities differed between sites and years. At site 1 the proportion of dries reduced as the proportion of multiple bearing ewes increased with an increase in liveweight. At site 2 most ewes had singles, while at site 3 the proportion of dry and multiple bearing ewes both increased with increasing liveweight.

What is more important at joining – liveweight or fat score?

Liveweight and fat score are highly correlated, so it is not surprising that the relative impact of liveweight and fat score on the number of foetuses scanned *in utero* are similar. The important point to remember is that the effect of fat scores, and hence the relationship between fat score and conception, are transferable across flocks and bloodlines as they are not affected by differences in mature body size or gut fill at the time of assessment. This is clearly not true for liveweight, which varies between flocks and across bloodlines due to differences in frame size between flocks and bloodlines. The ewes in this analysis were all superfine and fine bloodlines, therefore the relationship between liveweight and foetuses scanned per 100 ewes outlined above may not apply to medium and broader bloodlines.

Does a change in liveweight or fat score prior to joining have an impact on the number of foetuses scanned?

Neither liveweight changes nor fat score changes (loss or gain) of the ewes between weaning in 2004 and joining in 2005 or in the month prior to joining had a significant influence on the number of foetuses scanned following the 2005 joining. So the

length and degree of liveweight or fat score loss or gain during either of these periods had little impact on the number of foetuses scanned. It didn't seem to matter how the ewes reached their joining liveweight or fat score, only that they got there!

Nevertheless it is better to instigate any increase in fat score prior to the introduction of the rams. Economic analysis of data from the NSW Lifetime Wool sites suggests that supplementary feeding to increase fat score for higher numbers of foetuses *in utero* is rarely profitable, although this will depend on the responsiveness of ewes within a particular flock and the current fat score of the ewes. The latest results from the national Lifetime Wool project team suggest that an average of an extra 20 lambs are *born* per 100 ewes for each additional *condition* (assessed at the 'C' site over the backbone and short ribs) score at joining. However, note that the national range was 5 to 40, indicating that variation does exist in the responsiveness of reproduction of different flocks.

Where your flock sits in this range will have a large impact on the cost-effectiveness of managing ewes to achieve fat score targets at joining (that is, a +30 flock can economically be fed more than, say a +10 flock). Despite this it will always be far better to achieve fat score targets at joining through management of ewe fat score from weaning using available pasture.

See Primefact 309 for information on calculating how responsive the reproduction of your flock is to improved nutrition at joining.

What is the impact of a previous lambing on a subsequent pregnancy?

Ewes that are dry are less likely to conceive at their next joining (Figure 5). This is independent of their fat score or liveweight at the subsequent joining. In other words a dry ewe will tend to remain dry regardless of her fat score or bodyweight at joining. Similarly there was a trend for twin bearing ewes to continue to have twins at their subsequent joining.

Whether or not a ewe successfully reared her lamb in one year did not affect her ability to become pregnant at her next joining.

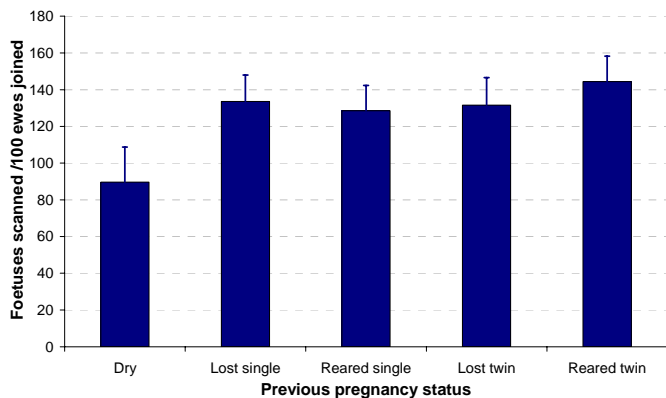


Figure 5: Dry ewes are more likely to be dry at their next joining.

What does this mean for managing a Merino breeding flock?

Improved body condition (either liveweight or fat score at joining) for adult ewes will result in more twin foetuses identified at scanning in your flock. Thorough planning and management following pregnancy scanning are required to ensure optimal survival and production from these additional twin lambs.

The dry adult ewes that were in score 3 or higher condition at joining are likely to be infertile and should be a priority for culling from the flock.

Dry adult ewes that were in poorer condition (score 2 or lower) at joining may have successfully reared twins the previous spring through mobilising their body reserves and been unable to recover their body condition between weaning and their next joining. This highlights the importance of giving ewes that have and rear twins every opportunity to regain body condition that they lost during lactation, before their next joining.

These results deal with the number of foetuses scanned *in utero* at mid-pregnancy. The impact of maternal nutrition during late pregnancy and lactation will have a large impact on both birth and weaning weights and hence survival of the progeny – this is particularly important for ewes carrying twins. It is therefore important to monitor ewes at critical stages during their reproductive cycle to minimise the difference between the number of foetuses scanned *in utero* and marking and weaning percentages. Research into lamb mortality conducted at Cowra has shown that lamb mortality can increase above fat score 3.5. For crossbreds the figure is fat score 4.

Important points

- Ewes below fat score 2.5 have an increased risk of being dry. Ewes at fat score 3 or above can be maintained at their present fat score.
- The specific action for ewes between fat score 2.5 to 3 depends on the responsiveness of your flock and the current seasonal conditions.
- The average lambing percentage of your flock can be improved by culling dry adult ewes from the breeding mob after pregnancy scanning.
- To improve overall flock reproduction, ewes that bear and rear twins should be given every opportunity to regain their body condition, lost during lactation, before next joining.
- The aim must be to achieve the target fat score off pasture. Economic analysis of the NSW Lifetime Wool data indicates that supplementary feeding for increased number of foetuses is marginal at current market prices.
- Monitoring ewes at critical stages during the breeding cycle is essential to minimise the difference between the number of foetuses scanned at mid-pregnancy and marking and weaning percentages.
- When you combine this foetal scanning data previously stated with previous lambs mortality findings, the ideal fat score range for Merino ewes during pregnancy is 3–3.5 and 3.5–4 for crossbreds.

© State of New South Wales through NSW Department of Primary Industries 2007. You may copy, distribute and otherwise freely deal with this publication for any purpose, provided that you attribute NSW Department of Primary Industries as the owner.

ISSN 1832-6668

Check for updates of this Primefact at:
www.dpi.nsw.gov.au/primefacts

The Lifetime Wool Project is a national project supported by Australian Wool Innovation, Dept of Primary Industries Vic, Dept of Agriculture and Food WA, NSW Department of Primary Industries, SA Research & Development Institute, Tas Dept of Primary Industries, Austral Park; Coleraine, Billandri Poll Merino Stud; Kendenup and over 120 producers across southern Australia.

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (February 2007). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Primary Industries or the user's independent adviser.

Job number 7587