

# Sheep production from pasture

## Chapter 3

### Contents

Why sheep gain and lose condition throughout the year .....	2
How is sheep condition monitored? .....	3
Managing breeding ewes .....	3
Measure to manage .....	3
How to condition score .....	4
The seven-step reproductive cycle .....	5
1. Start of joining (day 0) .....	7
2. Early to mid pregnancy (day 1–90) .....	8
3. Late pregnancy (day 90–150) .....	10
4. Lambing (day 150) .....	11
5. Lactation (day 150–240) .....	13
6. Weaning (day 240) .....	14
7. Post weaning/pre-joining (day 240–365) .....	15
Ewe condition and profitability .....	16
Fat scoring .....	20
Why fat score? .....	20
How to fat score .....	20
Weaners .....	22
Rams .....	23
Wool growth and quality .....	25
Summary .....	29
References .....	31
Appendix 3.1 – lifetimewool condition score yard book .....	32



A productive and viable sheep enterprise must aim to:

- effectively utilise quality pasture
- meet market specifications for its products (wool, meat, surplus sheep)
- optimise production of wool and lambs per hectare
- ensure grazing management optimises the growth and persistence of perennial grasses
- be cost-effective
  - Important determinants of profitability for a wool enterprise are wool cut per hectare, wool price and sheep sale price.
  - Important determinants of profitability for a prime lamb enterprise are stocking rate, weaning percentage, price and kg carcass weight per hectare.

The key tools for success are:

- knowing how to measure pasture to ensure nutritional targets can be met
- knowing how to assess ewe condition to maximise ewe performance
- knowing how to fat score lambs to meet market specifications
- using animal assessment skills to assist in setting nutritional targets for the various classes of sheep
- optimising supplementary feeding levels
- knowing the pasture supply and quality on your farm

## Why sheep gain and lose condition throughout the year

The condition changes that occur in sheep throughout the year are largely a reflection of feed quality and quantity. Animals must be carefully monitored, as weight loss during critical times may limit production and in turn reduce profitability.

The change in both quality and quantity of the food on offer determines the amount of variance in the energy (MJ ME) consumed daily. This is shown clearly in Figure 3.1.

Figure 3.1 – Feed energy (MJ) consumed daily

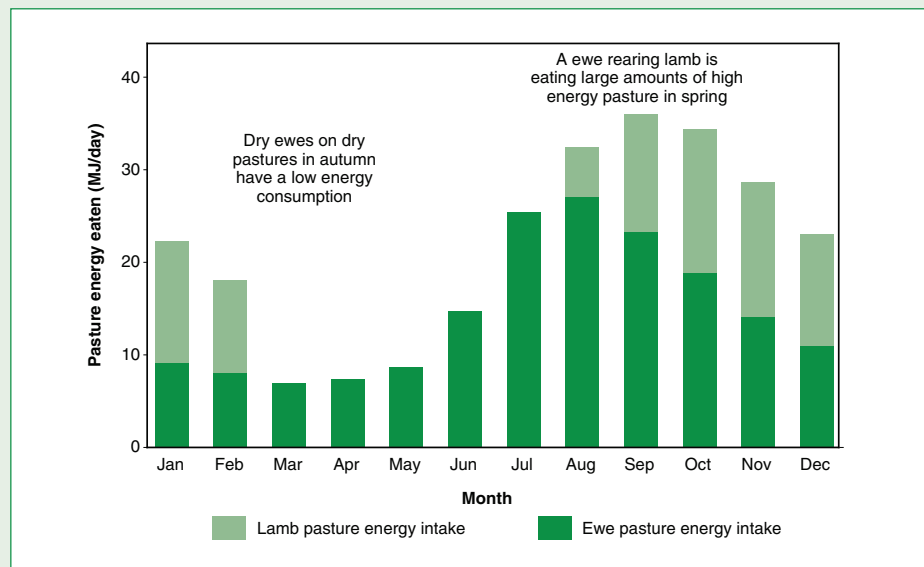


Figure 3.1 shows the variation in energy (MJ) consumed by sheep eating pastures of varying quality and quantity throughout the year. This example represents crossbred ewes rearing July born prime lambs. These lambs are growing to an export live weight of 48kg at seven months of age. On high quality pastures, in a 600mm annual rainfall area. In autumn, the ewes are eating smaller amounts of low energy, dry pasture. In spring when lambs are at foot, the ewes eat greater amounts of a high-energy pasture. With such a variation of feed on offer in a pasture-based system, it is highly important to monitor sheep condition regularly in order to ensure that their nutritional needs are being met.

## How is sheep condition monitored?

There are two techniques commonly used for monitoring the physical condition of sheep. These techniques are **fat scoring** and **condition scoring**.

Fat scoring is used to estimate total tissue depth in mm (fat and muscle), over the second last long rib. Fat scoring is used as an assessment tool in determining whether sheep will meet market specification for fatness. More information on fat scoring is found on page 21 of this Chapter.

Condition scoring estimates the tissue cover on the spine, over the ends of the short ribs and the fullness of the eye muscle. Condition scoring is used to monitor the nutritional status of ewes at critical times of the year.

There is a strong correlation between condition score (CS) and fat score, but the relationship is not linear. Fat score 2 (6–10mm) covers a range in condition score from 2 to 3.5. The range in ewe condition scores 2–3.5 can make the difference between selling lambs as stores or forward stores. Condition scoring is therefore a more precise guide to ewe management than fat scoring. More information on the correlation between fat score and condition score can be found at the lifetimewool website [www.lifetimewool.com.au](http://www.lifetimewool.com.au)

## Managing breeding ewes

Recent research by the lifetimewool project has shown that managing ewes to meet condition score targets will help wool producers to increase profits from their Merino flocks. Modeling has also shown this to be the case for prime lamb flocks.

The ewe plays a pivotal role in a sheep enterprise because she is the ‘engine room’ for production, so it makes sense to have her in the right condition at the right times. The lifetimewool project has shown that there are substantial productivity and financial penalties for not having ewes in good condition by lambing. At other times of the year, ewes in extra good condition at non-critical periods can cost money through the wasting of feed resources. Running ewes too thin, then trying to increase their condition on grain and dry feed can also be difficult and costly.

## Measure to manage

Managing ewes to meet optimal production targets relies on knowing the condition of the ewe. It is virtually impossible to visually estimate a ewe’s

condition or a mob's condition in the paddock. By the time visual changes are seen in the paddock, it is often too late to change management and feeding regimes. Condition scoring is the best way to assess a ewe's condition. Condition scoring is preferred over liveweight measurements as it:

- doesn't rely on a weigh crate being set up – can be done anywhere the sheep can be yarded
- can be done without having to correct for wool growth or the influence of wet wool on live weight
- needs no correction for weight of the foetus in pregnant ewes or the weight of fluid during lactation
- can be used on a mob of sheep with different frame sizes

Condition scoring is a simple and effective tool for providing an accurate measure of a ewe's nutritional status. The whole mob does not need to be individually condition scored. Research trials have shown that only a small proportion of the mob need be assessed in order to give an accurate measurement, providing some guidelines are followed.

Condition scoring uses estimates of the flesh cover on the backbone, over the ends of the short ribs and the fullness of the eye muscle between the two. Each assessment should only take a matter of seconds, and condition scoring enough sheep to gain an accurate assessment of the flock will only take approximately 20 minutes. This can be done while sheep are in for other husbandry activities.

Condition scoring a mob fortnightly at critical times can give a reliable indication of weight loss or gain. This is useful, particularly in the lead up to joining, as condition at joining can have a significant impact on lambing percentage. It is difficult to assess pasture quality and quantity when feed has hayed off, so it may be difficult to ensure your feed budget is meeting nutritional requirements. Condition scoring when feed has hayed off will provide more accurate information on a mob's general condition at this time and ensure nutritional requirements are being met.

### **How to condition score**

Only a small proportion of a mob needs to be assessed, 25–50 ewes. To select the ewes to condition score, let the first third of the mob run through, and then draft off every second ewe until you have 25–50 ewes to assess. Many people choose a couple of animals from each race full

when drenching or doing some other animal husbandry task which gives them a random selection of the mob. By ensuring a random selection of ewes is obtained for assessment, an accurate average condition of the mob can be determined. The average condition score that can then be used to make decisions such as feed budgeting.

To condition score, the animal should be standing in a relaxed position. It should not be tense, crushed by other animals or held in a crush. If the animal is tense, it is not possible to feel the short ribs and get an accurate condition score. Place your thumb on the backbone just behind the last long rib and your fingers against the stubby ends of the short ribs. Use the scoring system described below to assign a score. Many people use a system of half scores such as 2.0, 2.5, 3.0, 3.5 etc. Figure 3.2 describes condition scores and what is felt.

Be sure to record the scores so that you can calculate the average. A simple method of calculating the average condition score of a mob is to use the lifetimewool condition score yard book (refer to Appendix 3.1). This not only gives you a middle point but also shows the range of scores and whether there is a significant tail in the mob.

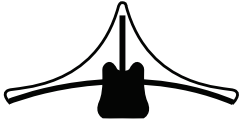
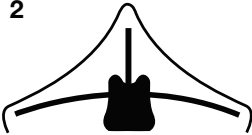
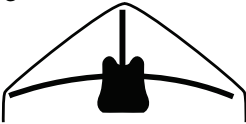
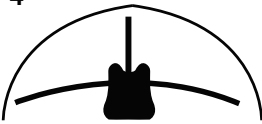

## The seven-step reproductive cycle

There are seven important phases in the reproductive cycle of ewes. The lifetimewool project has quantified the impact of nutrition on the production of the ewe and lamb in each of these phases. The cycle starts at joining (day 0), proceeds through lambing (day 150) and weaning (day 240), and finishes with the pre-joining management of ewes.

Management of ewe condition during each step of the cycle affects the following:

- conception success, reproductive rate, placental development, udder development and colostrum production of the ewe
- foetal growth of the lamb, including wool follicle development which influences wool production in the progeny
- ewe milk production, which influences lamb growth after birth

Figure 3.2 – Condition score description

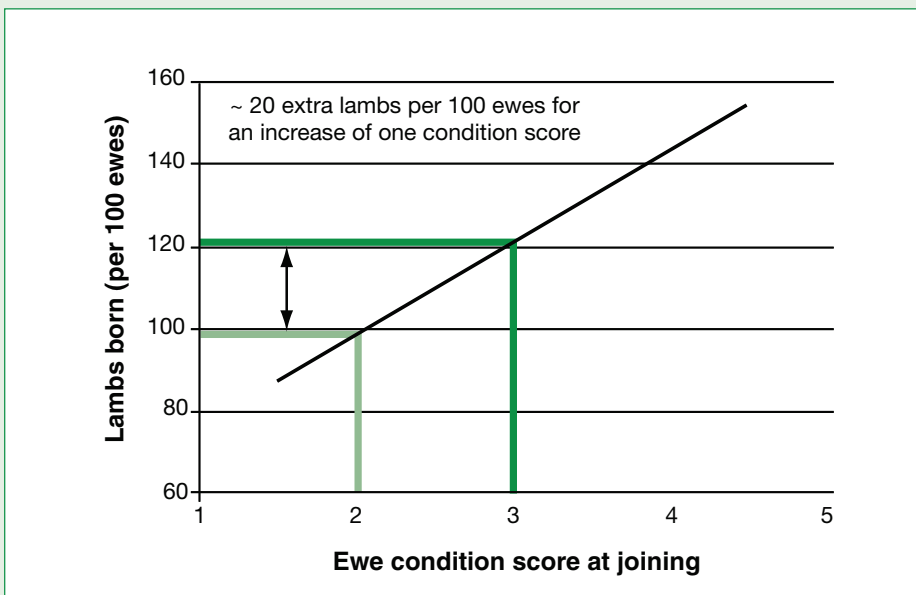
<p>1</p> 	<p><b>Backbone</b> The bones form a sharp narrow ridge. Each vertebra can be easily felt as a bone under the skin. There is only a very small eye muscle. The sheep is quite thin (virtually unsaleable).</p>	<p><b>Short ribs</b> The ends of the short ribs are very obvious. It is easy to feel the squarish shape of the ends. Using fingers spread 1cm apart, it feels like the fingernail under the skin with practically no covering.</p>
<p>2</p> 	<p><b>Backbone</b> The bones form a narrow ridge but the points are rounded with muscle. It is easy to press between each bone. There is a reasonable eye muscle. Store condition – ideal for wethers and lean meat.</p>	<p><b>Short ribs</b> The ends of the short ribs are rounded but it is easy to press between them. Using fingers spread 0.5cms apart, the ends feel rounded like finger ends. They are covered with flesh but it is easy to press under and between them.</p>
<p>3</p> 	<p><b>Backbone</b> The vertebrae are only slightly elevated above a full eye muscle. It is possible to feel each rounded bone but not to press between them. (Forward store condition ideal for most lamb markets now. No excess fat).</p>	<p><b>Short ribs</b> The ends of short ribs are well rounded and filled in with muscle. Using four fingers pressed tightly together, it is possible to feel the rounded ends but not between them. They are well covered and filled in with muscle.</p>
<p>4</p> 	<p><b>Backbone</b> It is possible to feel most vertebrae with pressure. The back bone is a smooth slightly raised ridge above full eye muscles and the skin floats over it.</p>	<p><b>Short ribs</b> It is only possible to feel or sense one or two short ribs and only possible to press under them with difficulty. It feels like the side of the palm, where maybe one end can just be sensed.</p>
<p>5</p> 	<p><b>Backbone</b> The spine may only be felt (if at all) by pressing down firmly between the fat covered eye muscles. A bustle of fat may appear over the tail (wasteful and uneconomic).</p>	<p><b>Short ribs</b> It is virtually impossible to feel under the ends as the triangle formed by the long ribs and hip bone is filled with meat and fat. The short rib ends cannot be felt.</p>

## 1. Start of joining (day 0)

The condition score on the day of conception is the major predictor of reproductive rate and it is more important than changes in condition prior to joining. Ewes in better condition at joining conceive more lambs. For each extra condition score at joining, between 0 and 40 more lambs are conceived per 100 ewes joined. Responses are greater for spring lambing flocks than autumn lambing flocks. Genetics is also an influencing factor.

On poor pasture, ewes can lose one condition score over 35 days, therefore it is important to maintain ewe condition over the joining period to ensure maximum conception rates.

**Figure 3.3 – The relationship between ewe condition score and the number of lambs conceived**



Knowledge of the relationship between condition score at joining and conception rates for an individual flock enables tailored management.

Where a flock's reproductive rate is very responsive to increased body condition, more lambs will contribute to profitability. In this instance, it may be worthwhile maintaining higher body condition than recommended from weaning to the end of joining.

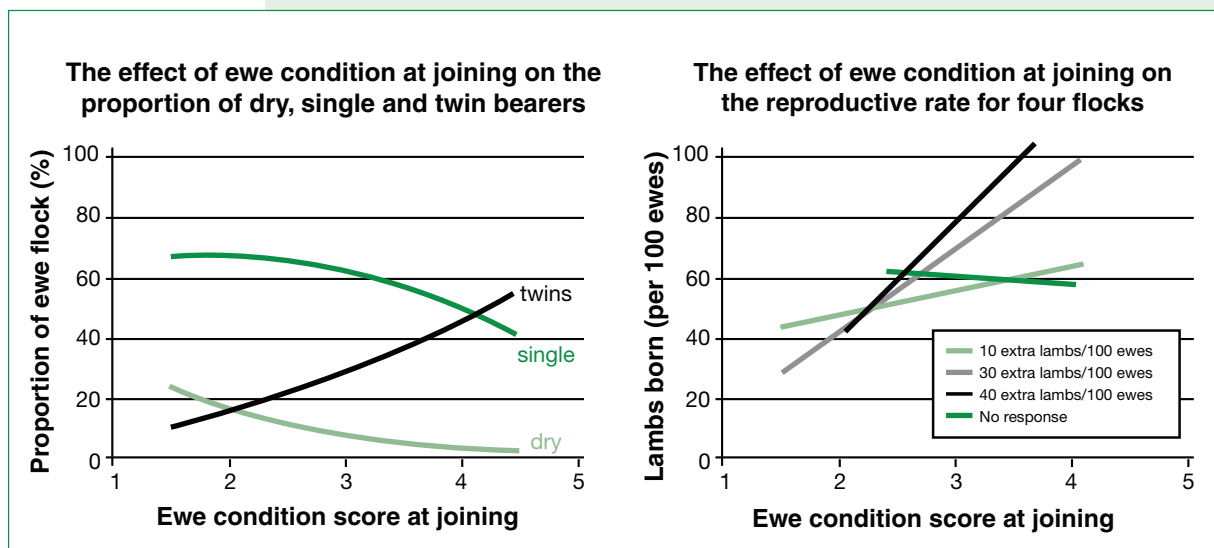
If reproductive rates are not responsive to increased condition at joining, there will be little benefit in lifting feeding rates to increase condition.

Scanning ewes at day 90 for single and twin foetuses and then comparing this with the condition score of the ewes at joining will enable assessment of the potential to increase reproductive rates in the flock.

If ewes are in poor condition (less than CS 2.0) at joining, those that do conceive are unlikely to be able to gain enough condition prior to lambing to ensure good survival rates for both ewe and lamb. Production outcomes for these ewes may be improved by drafting them from the main flock and giving them the best emerging green feed.

Alternatively, consider not mating ewes that are in poor condition and run them as 'dries' for the season. A ewe of CS 2.0 at joining will need three months on good green feed to be at CS 2.5 by lambing.

Figure 3.4 – The effect of condition score on numbers born per ewe and flock reproductive rates



## 2. Early to mid pregnancy (day 1-90)

The condition score during the early to mid pregnancy phase affects lamb birth weight, fleece weight and fibre diameter, and these effects on the developing lamb are permanent.

Poor ewe nutrition during early to mid pregnancy reduces placenta size and lamb birth weight. Poor ewe nutrition (loss of one condition score) during early to mid pregnancy will reduce lamb birth weight by up to 0.30kg – smaller lambs are less likely to survive to weaning.

Ewe nutrition in early pregnancy will affect the ability of the ewe to reach late pregnancy condition targets. Starting from a very low condition in early pregnancy will not give the ewe enough time to gain condition in time for lambing, potentially reducing the chances of lamb and ewe survival.

The lamb's future wool production is affected by ewe nutrition during early to mid pregnancy and the effects on the developing lamb are permanent. Poor ewe nutrition during early to mid pregnancy increases the fibre diameter and decreases fleece weight of the progeny reducing fleece value for the lifetime of the progeny.

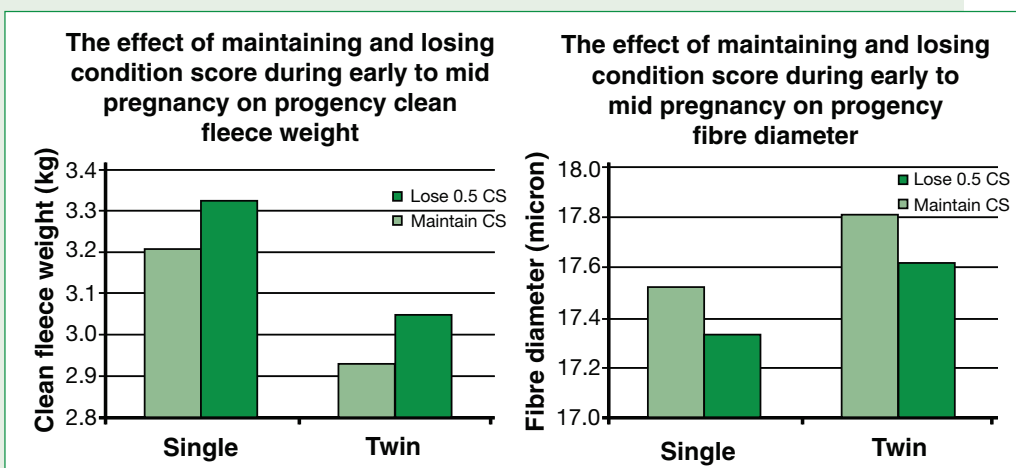
Ewes should be fed to maintain condition during early to mid pregnancy as a condition score loss of 0.5 results in progeny which will produce 0.1kg per head less wool and up to 0.2 micron coarse wool than lambs from ewes which have maintained condition. These affects are cumulative.

Small losses in condition score during early to mid pregnancy can be overcome by gains in ewe condition in late pregnancy.

Due to the cost of supplementary feed required to maintain the condition of a ewe, a controlled loss of condition (maximum of 0.3 of a condition score) until the break of season is the most cost effective approach, so long as condition can be recovered in late pregnancy on green feed. This will often require tactics such as deferred grazing.

Consider scanning ewes for singles or twins at day 90 to allow for separate management throughout late pregnancy and lactation.

**Figure 3.5 – The effect of condition score during early to mid pregnancy on progeny fleece weight and fibre diameter**



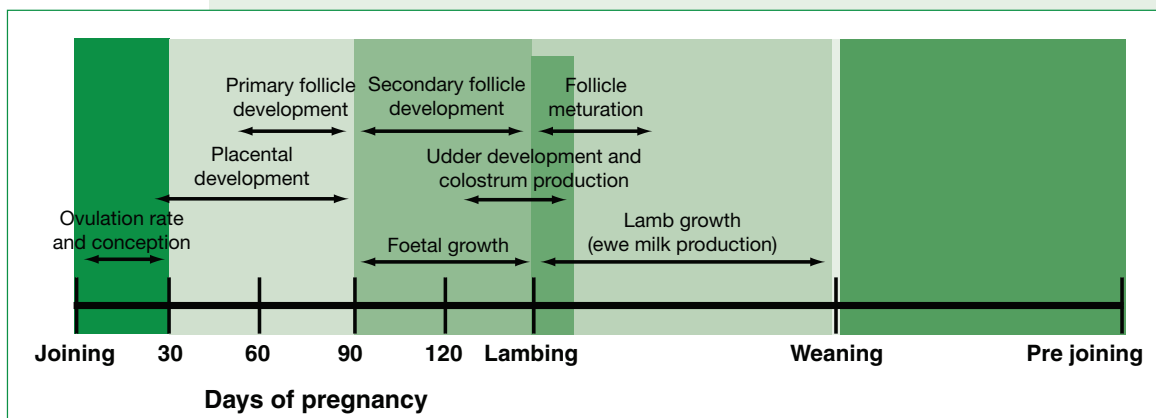
### 3. Late pregnancy (day 90-150)

The condition score in late pregnancy can influence the growth of the foetus as well as secondary wool follicles, which directly influence the density and fineness of the fleece. Good nutrition in the late pregnancy phase ensures that optimal birth weights and other pregnancy targets can be achieved.

Most of the growth of the developing lamb occurs in the last 50 days before birth.

Ewe nutrition (gaining one condition score) during late pregnancy has a greater impact on lamb birth weight (up to 0.45kg), than early pregnancy nutrition (up to 0.33kg). The table below illustrates the stages of pregnancy and lamb development in relation to the reproductive cycle of a ewe.

Figure 3.6 – Stages of pregnancy and lamb development in relation to the reproductive cycle



The amount of feed on offer (kg DM/ha) during late pregnancy and lactation affects the nutrition of the ewe and the fleece characteristics of her progeny.

The ewe's energy requirement increases by 50% for single bearers and 80% for twin bearers by lambing. To increase the ewe's energy intake sufficiently, higher amounts of good quality feed (kg DM/ha) must be made available. The effects of loss of ewe condition on progeny birth weight, fibre diameter and fleece weight (prior to day 90), can be overcome by returning the ewe to target condition by lambing. Good nutrition in late pregnancy is required to achieve high secondary wool follicle density,

which leads to lower fibre diameter and higher fleece weight – these effects are for the life of the progeny.

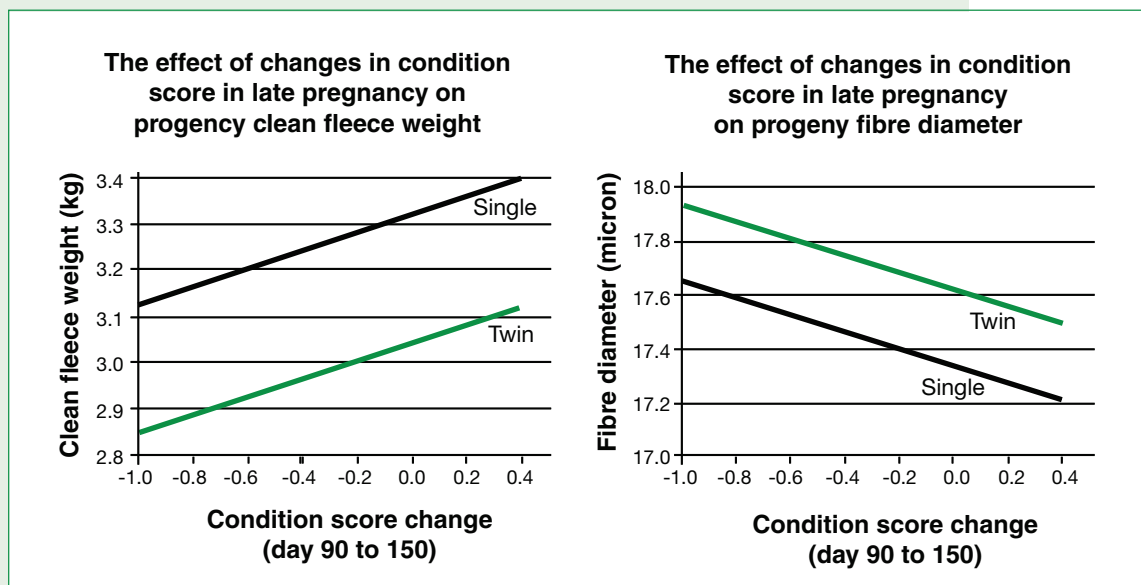
Secondary follicles are the most important part of the wool-producing skin, having a direct influence on the density and fibre diameter of the fleece. A higher follicle density reduces the average fibre diameter of the fleece.

Good nutrition in late pregnancy can achieve a reduction of up to 0.2 micron in fibre diameter and a 0.1kg increase in clean fleece weight for each gain of 0.5 of a condition score.

Single and twin bearing ewes can be managed separately to meet their specific feed requirements, if the flock is pregnancy scanned.

Single and twin lambs are equally affected by nutrition of the ewe during pregnancy; however twins will always have lower production than singles due to the competition for nutrition.

Figure 3.7 – The effect of condition score in late pregnancy on progeny fleece weight and fibre diameter



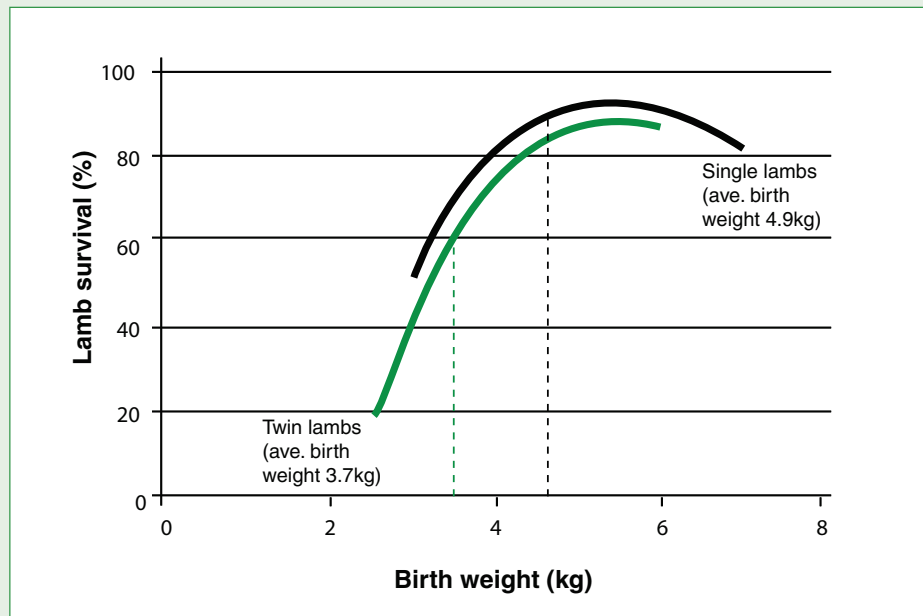
#### 4. Lambing (day 150)

The condition score of the ewe at lambing influences birth weight and survival of the lamb. The first 48 hours of a lamb's life are critical. Around 70% of lamb mortality from birth to weaning occurs within this period. The survival of single and twin-born lambs is mostly affected by birth weight,

which in turn is influenced by the ewe's condition during pregnancy, with late pregnancy being the most important phase.

The optimum birth weight for lamb survival is between 4.5 and 6.0kg. Having ewes in condition score 3.0 at lambing ensures that both survival and production are at high levels.

**Figure 3.8 – The relationship between lamb birth weight and survival**



Ewe condition has its largest effect on birth weight in late pregnancy. Losing condition in early pregnancy and regaining lost condition in late pregnancy can lead to higher birth weight and survival. However, it is only profitable to regain the previously lost condition using green feed.

Twin lambs are much more sensitive to changes in ewe condition score. With this in mind, twinning ewes should be given higher priority when feed supply is limiting. Higher condition scores of twinning ewes at lambing (CS 4.0 compared to CS 3.0) can mean an increase in lamb survival of more than 10%.

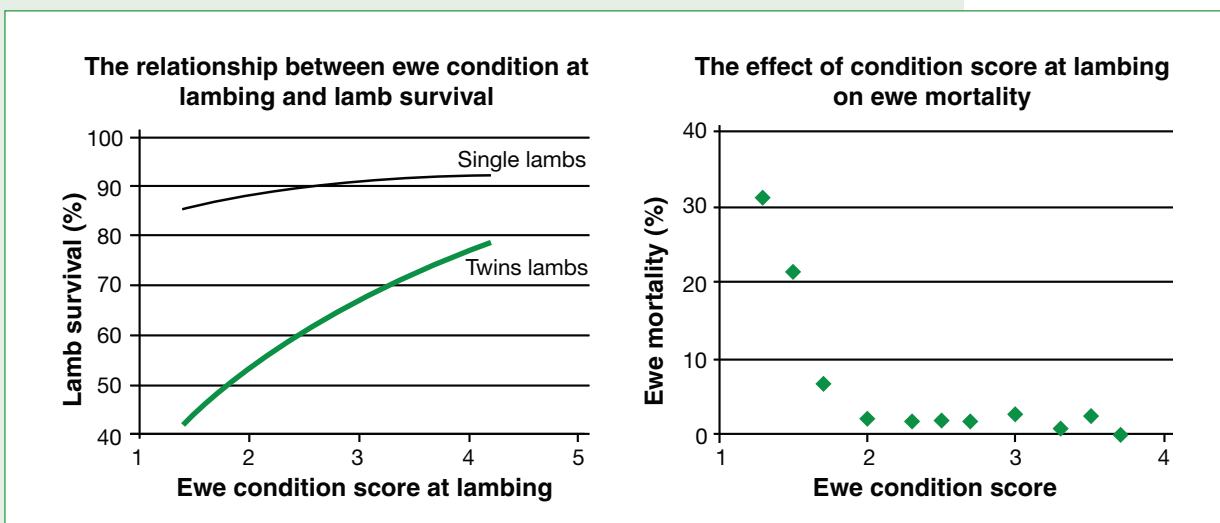
On-farm case studies of lamb survival in Victoria show that 15–20% more lambs survive when born to ewes of CS 3.0–3.5, compared with ewes of CS 2.0–2.5.

Poor nutrition and low condition score have detrimental effects on ewe and lamb behavior, contributing to increased lamb mortality. Ideally, the

ewe and lambs should remain at the birth site for at least six hours. Ewe mortality can be a serious issue when condition score falls below 2.0 during late pregnancy or at lambing. Maintaining adequate ewe condition to avoid mortality is especially important where there is likely to be poor weather conditions and/or low pasture feed availability. Any individual ewe whose condition score is less than 2.0 prior to lambing should be managed separately and have increased access to good feed. Twinning ewes are more likely to be in danger than single bearing ewes, with at least 2–3% higher mortalities for the same condition score.

Ewes in condition score over 4.0 (particularly single ewes in a good year) may be at risk of having lambing difficulties (dystocia).

**Figure 3.9 – The effect of ewe condition score on lamb survival and ewe mortality**



## 5. Lactation (day 150-240)

Ewes in good condition during lactation produce more milk, which translates to larger lambs with higher survival and growth rates.

Feed on offer (kg DM/ha) during lactation is the main factor driving lamb growth rates.

Improved ewe nutrition through lactation means bigger weaners and better weaner survival (refer to Table 3.2 for pasture targets during lactation). Even ewes in good condition will use fat reserves as well as pasture to provide high lactation levels, and so will tend to lose condition

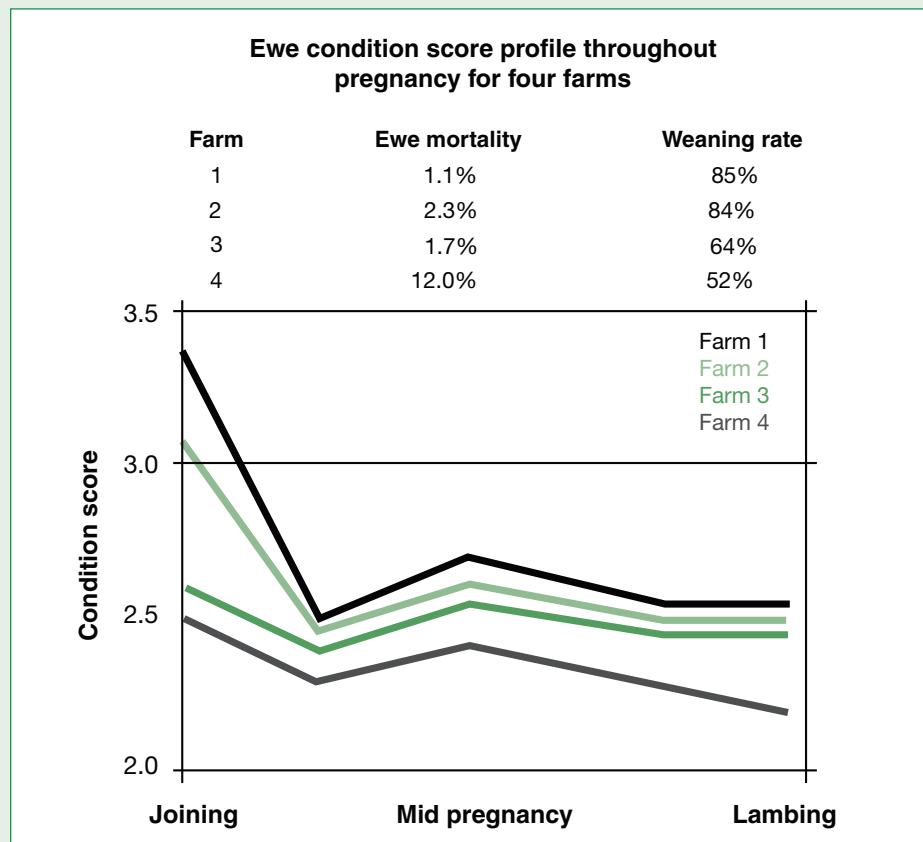
over lactation. Ewes in poor condition will have poorer milk production and tend to wean lambs earlier, resulting in lower lamb growth rates.

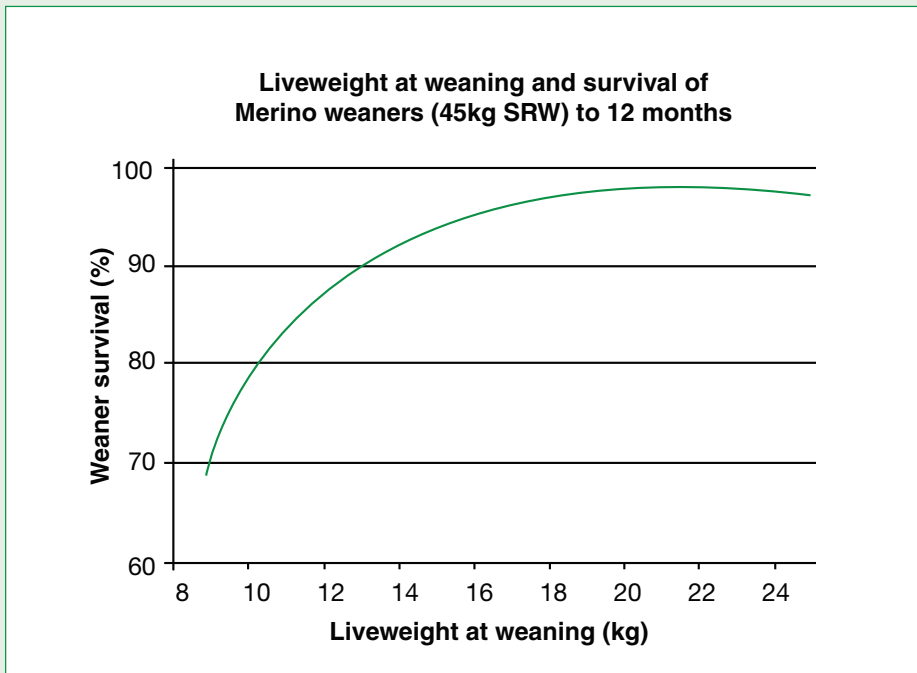
## 6. Weaning (day 240)

Lamb liveweight at weaning has a strong influence on weaner survival. Lambs should be weaned no later than 14 weeks from the start of lambing. Growth of weaners to be grown out as replacements needs to be closely monitored to ensure growth through summer, autumn and into winter to ensure high survival. There are no benefits to either ewe or lamb from delaying weaning past 14 weeks.

Preferential treatment (including supplementary feeding) of light weaners that are less than about 45% of adult liveweight should be standard practice.

Figure 3.10 – Effect of ewe condition score on weaning rate and weight, and ewe mortality





## 7. Post weaning/pre-joining (day 240–365)

Ewes need to be in CS 3.0–3.5 for a late winter/spring lambing and CS 2.7 or greater for an autumn lambing. This will allow high reproductive rates to be achieved and ensure good condition is achieved by the following lambing through cost effective means. The period from weaning to joining is therefore important as this is the time to get the ewes in the right condition for joining. Greater time spent grazing high quality green feed post weaning, the lower the cost of achieving condition targets prior to joining. Monitor ewes for condition at least twice during this period.

Make the best use of pasture to put weight back onto ewes immediately after weaning. Ewes can then be allowed to lose weight gradually in summer and autumn to CS 3.0.

Once ewes are below CS 3.0 it is difficult and expensive to lift their condition when pasture has dried off and pasture quality has decreased.

Feed budgets and planning for supplementing ewes to maintain condition should be carried out before they slip below target condition scores.

## Ewe condition and profitability

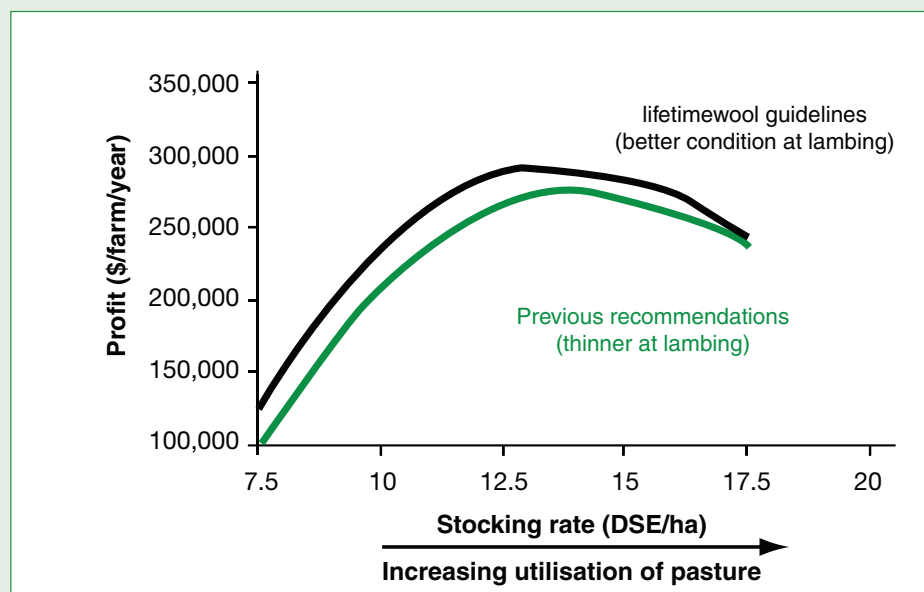
Profitability in sheep enterprises is driven by several key factors including stocking rate and the amount of pasture grown and utilised. Matching the time of lambing to maximum pasture availability allows for higher stocking rates and pasture utilisation to be achieved, thereby increasing profit. The availability of pasture affects the condition of the ewe, which in turn directly affects production factors that influence lamb survival, and the wool production of both the ewe and her progeny.

### Late winter/spring lambing flocks

Late winter and spring is when feed is most plentiful. Late winter/spring lambing, particularly in the high rainfall zone, provides the best match of pasture availability to the energy needs of ewes and lambs. This match lifts pasture utilisation and allows stocking rate to be increased. The 'optimum' stocking rate will vary season to season, farm to farm and both within and between regions.

Figure 3.11 illustrates the impact of stocking rate on the whole farm profit for a late winter/spring lambing. The graph also shows that managing according to guidelines from lifetimewool can further increase profitability by approximately 15%, particularly up to the optimum stocking rate of 12.5 DSE for the model farm.

Figure 3.11 – The effect of meeting lifetimewool targets on profitability

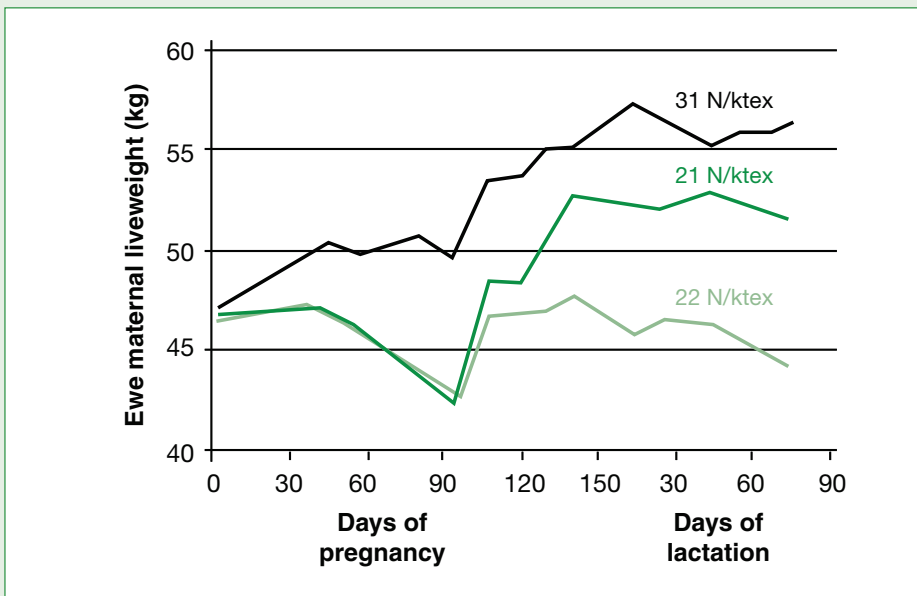


### Autumn lambing flocks

Other factors such as weaner survival over summer may result in some producers preferring an autumn lambing even though this period of lambing is generally less profitable. Maintaining condition throughout pregnancy for May lambing ensures that lambing targets are met while achieving the most efficient use of grain and existing paddock feed. The relationship between stocking rate and whole farm profit is less important than the impact of the amount of grain fed or the cost of grain. For this reason producers should look at holding their current stocking rates and have their ewes in better condition for lambing.

Figure 3.12 illustrates the impact of stocking rate on whole farm profit for May lambing flocks and shows that managing according to lifetimewool guidelines can further increase profitability by approximately 5–8% depending on stocking rate.

Figure 3.12 – Better feeding of ewes improves staple strength



### Condition score profile

Ewe condition has a significant effect on profitability at any stocking rate.

Increasing stocking rate without adequate nutrition for ewes may reduce lamb survival and wool production, which in turn may limit profitability. Inadequate nutrition can limit profitability at any stocking rate.

Before lifetimewool defined the effects of ewe condition on fleece production and lamb mortality, it was assumed that running ewes thinner and losing more weight over the autumn and during pregnancy meant increased profit through savings in feed costs. We now know there are substantial penalties for not having ewes in good condition for lambing. These impacts must be included when evaluating the financial implications of different management strategies for ewe flocks.

Ewe condition during pregnancy affects the progeny's lifetime production. Lamb birth weight, survival and progeny fleece value are closely related to ewe condition during pregnancy, and particularly her condition at lambing.

During pregnancy, the effects of ewe condition on progeny birth weight, survival and wool production are additive. That is, the impacts of nutrition in early to mid pregnancy can be added to the impacts of nutrition in late pregnancy. Even though the impacts appear small at each phase, they can add up to a large impact on profitability for that lambing. The effects on fleece value are permanent for the lifetime of the progeny. Table 3.1 shows the effects of changes in condition score during pregnancy on a number of measures of production in both the ewe and her progeny. The table can be used to assess the impact on production of a range of condition score profiles during pregnancy.

**Table 3.1 – Impact of condition score profile throughout pregnancy on ewe and progeny production**

- The grey row shows ewe production and progeny production when the ewe is maintained at condition score 3.0 throughout pregnancy.
- All other figures show the difference in production when condition score throughout pregnancy differs from 3.0. These figures relate to the genotype of a medium Merino (50kg) ewe with 4kg CFW and 20.5µm wool.
- The first row shows the base line for the condition score profile of 3.
- Although this table is based on Merinos, anecdotal evidence suggests that similar responses are found in prime lamb flocks.

If ewes gain 0.5 CS from day 90 to lambing 16% more twin lambs will survive.

if ewes are allowed to lose 1.0 CS from joining to lambing there is likely to be a 3.2% increase in lamb ewe mortality'

Condition score profile			Ewe production				Progeny production					
Joining	Day 90	Lambing	CFW (kg)	FD (µm)	Mortality (%)	Reprod. rate (%)	CFW singles (kg)	CFW twins (kg)	FD singles (µm)	FD twins (µm)	Survival singles (%)	Survival twins (%)
3.0	3.0	3.0	4.1	20.5	3.2	120	3.4	3.1	17.6	18.1	91	71
Condition score profile			Difference in ewe production compared to ewes maintained at CS 3.0				Difference in progeny production compared to ewes maintained at CS 3.0					
Joining	Day 90	Lambing	CFW (kg)	FD (µm)	Mortality (%)	Reprod. rate (%)	CFW singles (kg)	CFW twins (kg)	FD singles (µm)	FD twins (µm)	Survival singles (%)	Survival twins (%)
2.5	2.0	2.0	-0.6	-0.6	3.2	-11	-0.1	-0.1	0.2	0.2	-13	-28
		2.5	-0.3	-0.2	0.8	-11	-0.1	-0.1	0.0	0.0	-3	-6
	2.5	2.0	-0.6	-0.6	3.2	-11	-0.1	-0.1	0.2	0.2	-17	-35
		2.5	-0.3	-0.2	0.8	-11	-0.1	-0.1	0.0	0.0	-5	-12
3.0	2.5	2.0	-0.7	-0.6	3.2	0	-0.2	-0.2	0.3	0.3	-19	-39
		2.5	-0.4	-0.2	0.8	0	-0.1	-0.1	0.2	0.2	-6	-15
		3.0	-0.0	0.2	0.0	0	0.0	0.0	0.0	0.0	-2	5
	3.0	2.5	-0.3	-0.2	0.8	0	-0.1	-0.1	0.2	0.2	-9	-21
3.5	3.0	2.5	-0.4	-0.2	0.8	11	-0.1	-0.1	0.3	0.3	-11	-24
		3.0	-0.1	0.2	0.0	11	0.0	0.0	0.2	0.2	-1	-2
	3.5	2.5	0	0	0	0	0	0	0	0	0	0
		3.5	0.3	0.7	-0.1	0	0.1	0.1	0.0	0.0	5	16
3.5	3.5	3.0	-0.1	0.3	0.0	11	0.1	0.1	0.2	0.2	-3	-8
		3.5	0.3	0.7	-0.1	11	0.0	0.0	0.0	0.0	4	10
	4.0	3.0	0.6	0.8	0.1	11	0.1	0.1	-0.2	-0.2	7	23
		3.5	0.6	0.8	0.1	11	0.1	0.1	-0.2	-0.2	7	23

Source: Values based on lifestimewool experimental data. CFW=clean fleece weight. FD=fibre diameter

## Fat scoring

### Why fat score?

Fat scoring is a useful technique for monitoring the fatness of lambs or older sheep for processing in order to meet market specifications.

Fat scoring is the standard technique for describing the fatness of sheep carcasses when processing. Carcasses can be classified into five standard AUS-MEAT categories, ranging from 1 (leanest) to 5 (fattest).

Fat scoring values can be used with liveweight measurements in order to estimate a dressing percentage. Once a dressing percentage is established, an estimated carcass weight of the animal to be marketed can be calculated.

### How to fat score

Fat scoring undertaken on live sheep is done by using the tips of the fingers and thumb to feel the amount of fat on the animal at the GR site. The GR site is the best representation of overall carcass fat. This site is 110mm from the backbone over the 12th rib (second last long rib) as shown in Figure 3.13 and described in Table 3.4. It is easy to feel the tail, but the tail is a less reliable method of assessing fat cover and a poor guide to carcass fatness. The GR site is also measured on the hot carcass, in the processing plants.

The range of each fat score is defined by the total depth of soft tissue over the bone at the 'GR' site. There are five fat scores, each having a 5mm range. Accuracy of fat scoring on live sheep can be verified by comparing estimated values taken from the live animal to measured tissue depths at the GR site on carcasses.

When fat scoring on live animals, the animal should be in a relaxed state, and only slight pressure should be applied to the site. If the fat scoring is conducted correctly, no bruising will result. Table 3.4 describes what would be felt in each fat score range. All lambs need to be fat scored if targeting specific market requirements especially if price penalties are applied to carcasses falling out of specification.

Figure 3.13 – Site for fat scoring

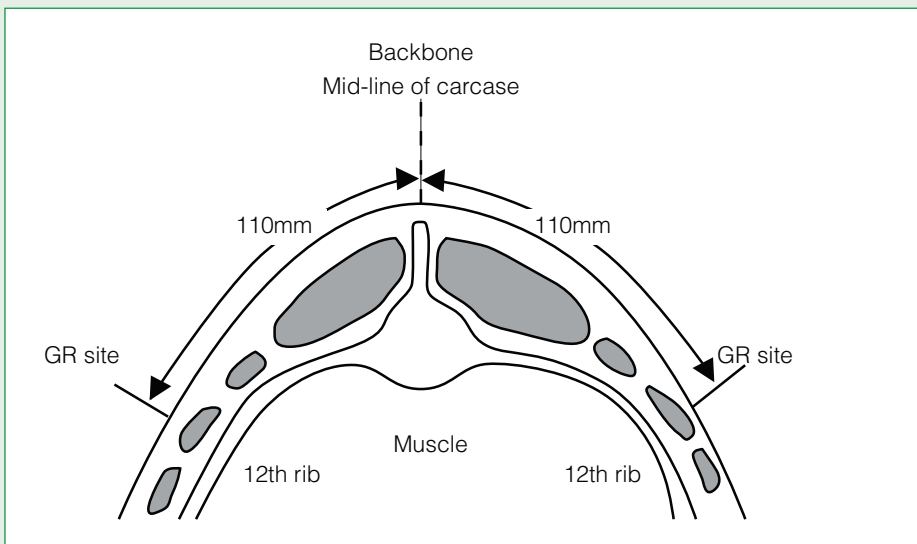
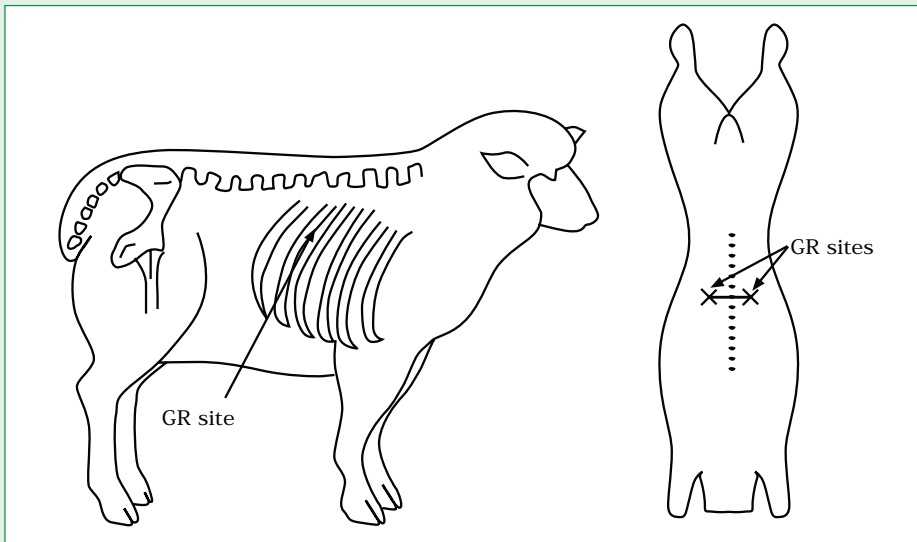


Table 3.4 – Fat scoring of sheep

Description	Fat score	Tissue depth over rib (mm)
Individual ribs are easily felt and no tissue can be felt (sliding) over the ribs. Depressions are quite obvious between ribs.	1	0–5
Individual ribs are felt with some tissue able to be felt over the ribs. Depressions between ribs are obvious.	2	6–10
Individual ribs can still be felt but they are quite rounded, with tissue movement felt over the ribs. The depression between ribs is less obvious.	3	11–15
The ribs are less obvious to feel, with only some depression between the ribs. Tissue movement over the ribs is apparent.	4	16–20
It is difficult to feel ribs, or any depression between the ribs. Sliding over the ribs is easy.	5	21+

## Weaners

There is a strong association between post weaning survival and bodyweight. It is important to ensure that a steady growth rate of 0.5–1kg/month is maintained, to ensure weaners meet liveweight targets and to reduce weaner mortality. The growth target for weaners is to reach 50% of their mature, four-year-old weight as soon as possible after weaning by the autumn break. The main issue is to ensure weaners continually graze high quality pasture or are provided a high quality diet. When the pasture starts to dry off and digestibility declines at the start of summer, it is usually profitable to draft the weaners into groups based on body weight. This makes it easier to monitor and feed, or sell the weaners accordingly. It is a good idea to teach the weaners to eat grain prior to weaning. Three feeds of grain to the ewes and lambs is sufficient for them to permanently recognise grain as a feed, although they may not recognise other types of grain. Consideration to summer crops and supplementary feed may need to be included as part of the target feeding strategy. Ewe weaners that are fed poorly and severely under-nourished in their first year can reduce lifetime reproduction by up to 20 percent. Table 3.5 shows target weights for young sheep from birth to first joining. Maiden ewes need to be about 75% of their mature weight at joining so if maiden ewes are well below this you may consider not joining.

**Table 3.5 – Target weights for weaners**

Mature weights	Target weights (kg)				
	Birth	Pasture drying off	Autumn break	Late winter	Joining
45kg	4	20	22.5	27	24–36
50kg	4.5	22.5	25	30	37.5–40
55kg	5	25	27.5	33	41–44
60kg	5	27	30	36	45–48
70kg	5.5	31.5	33.5	42	52.5–46
% mature weight	8–9%	45%	50%	30%	75–80%

Source: Drought Feeding and Management of Sheep, Court J., 2006, Department of Primary Industries

Careful planning should be taken when selecting paddocks for lambs and weaners. Grazing paddocks with low seed infestations particularly barley grass and corkscrew, should be a priority. If lambs need to graze on paddocks that are heavily infested by seed, either spray top or slash the paddock to reduce seed contamination.

Worms are also an important factor to consider when allocating weaners and lambs to paddocks. Weaners and lambs are more vulnerable to internal parasites in the first 12 months than adult sheep. Worms frequently reduce weaner and lamb performance. Weaning at 12–14 weeks removes lambs from pastures which are likely to be highly contaminated by worm larvae. Lambs should be weaned onto ‘clean’ paddocks – those previously grazed by cattle or adult dry sheep. (Grazing for worm control is covered in Appendix A.) Worm faecal egg counts (FEC) should be taken regularly from weaners and lambs and then drenched accordingly. The build-up of a weaner’s resistance to worms is enhanced by following a strategy that ensures rapid weaner growth. For more information on worm management, refer to AWI’s Worm Boss. [www.wormboss.com.au](http://www.wormboss.com.au)

## Rams

Rams in work can lose a lot of condition; the extent of the loss depends somewhat on how hard they are expected to work (ratio of ewes:rams).

Rams should be at a condition score of 3.5 at the start of joining. Check their condition at least two months before joining.

Rams need to have sufficient body reserves to get them through the joining period. If rams need to increase condition score before joining. Supplement with a high quality feed such as lupins prior to joining to ensure maximum testicle size and sperm production. Supplementation may be required for 6–8 weeks depending on how much condition score must be increased.

Shear rams at least eight weeks before joining. This reduces the impact of any temperature changes arising from fever caused by shearing cut infections, which may affect semen quality.

Join rams at 1% +1 extra ram for mature ewes (eg at least five rams for a mob of 400 ewes) and 1.5% +1 for maiden ewes and 2% for ewe lambs. Higher ram joining rates are also needed in large paddocks which have multiple watering points or when joining outside the main breeding season.

Avoid joining inexperienced rams to maiden ewes.

Join rams for two 17-day cycles, or five weeks. Most ewes will get pregnant in that period.

Minimise the risk of lambing difficulties by not joining meat breed rams with higher Australian sheep breeding values (ASBVs) for birth weight to maiden ewes.

Replacement rams should be purchased at least two months before joining to allow them to acclimatize and become accustomed to feed regimes, minimising any negative impacts on semen quality.

If ewes are to be supplementary fed during joining ensure that the rams have also been introduced to the feed to avoid acidosis (grain poisoning).

In addition to the normal condition scoring techniques used for sheep, palpation of the ram's testicles for size and consistency will provide important information about the ram's readiness for joining. Small, soft testicles indicate under nourishment or testicle damage (eg disease) and a likely poor conception rate. Testicles should be firm and springy on palpation with a scrotal circumference above 28cm and no abnormal lumps. Rams with abnormal lumps on their testicles should be tested for ovine brucellosis.

Rams should be vaccinated and jetted to prevent flystrike.

## Wool growth and quality

There is a direct relationship between pasture intake and wool growth.

Figure 3.14 shows how pasture intake affects body weight, wool growth and average fibre diameter throughout they year. Note that as the pasture intake declines, wool growth and fibre diameter also decline.

### Nutrition affects staple strength

Three factors that explain much of the difference in staple strength between sheep are:

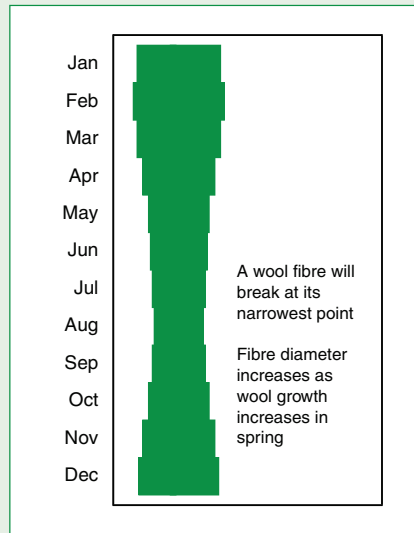
- variation in fibre diameter along the fibre
- the minimum fibre diameter
- the rate of change of fibre diameter over time (eg high pasture growth rates in spring can cause a quick increase)

Ewes lambing on herbage mass below the pasture benchmarks in Table 3.2 may rear a lamb, but in addition to the likelihood of considerable weight loss in the ewe and decreased lamb growth, are more likely to produce tender wool.

Wool fibres break at their finest point. Rainfall and a sudden change to green feed at the break does not weaken wool although it may break at this point because it gets stronger after the green feed arrives. See Figure 3.14.

**Figure 3.14 – Seasonal variation of FD**

This diagram shows how the fibre diameter along a Merino wether wool fibre varies throughout the season (Hamilton GrassGro simulation).



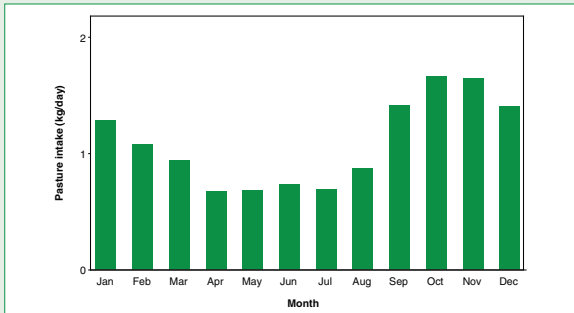
Specific feeding strategies at the autumn break are not beneficial for wool strength unless body weight is very low.

Sheep in poor condition that suddenly return to maximum feed intake show a greater decrease in tensile strength in comparison to those in better condition and others that have a slower increase in their feed intake.

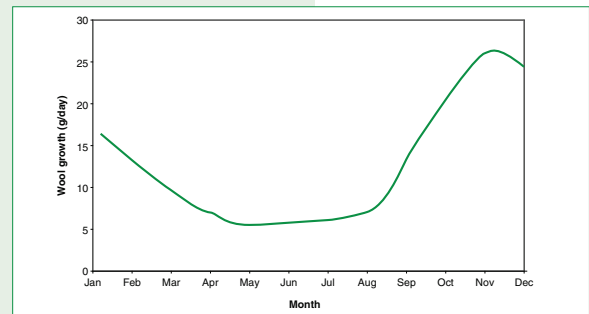
**Figure 3.15 – Relationship between pasture intake liveweight and wool production in wethers at Hamilton**

The graphs were generated using CSIRO’s GrassGro computer program, and represent a medium wool wether flock stocked at 12.5 wethers/ha grazing a medium productivity annual grass/sub-clover pasture at Hamilton in 1996. The predicted clean wool production for the year was 4.7kg and the average fibre diameter was 22.1 microns.

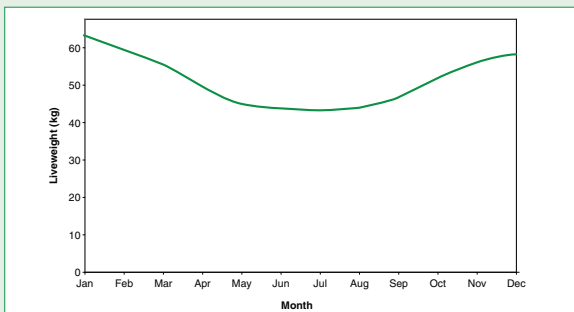
**a. Pasture intake**



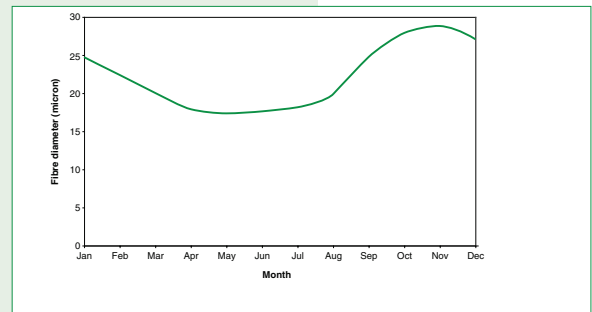
**c. Wool growth**



**b. Liveweight**



**d. Fibre diameter**



The Cooperative Research Centre for Premium Quality Wool (in the 1990s) has developed some general rules of thumb on avoiding tender wool. They are:

- A weight loss of 50g/day over autumn reduces staple strength by 7–11N/ktex. This relationship was consistent across various ages of sheep and field sites.
- Keeping a uniform diameter along the fibre by restricting spring liveweight gains can increase staple strength by up to 5N/ktex.
- Increasing the minimum diameter along the fibre by one micron can improve staple strength by up to 4N/ktex.
- A genetic reduction in CVFD (coefficient of variation in fibre diameter) of five percentage points can increase staple strength by 8–16N/ktex.
- Lambing ewes on green feed after the autumn break or in spring will increase the staple strength of their wool by 5–7N/ktex compared with lambing before the break.

## Summary

The tables below summarises the pasture and condition score targets for optimum production.

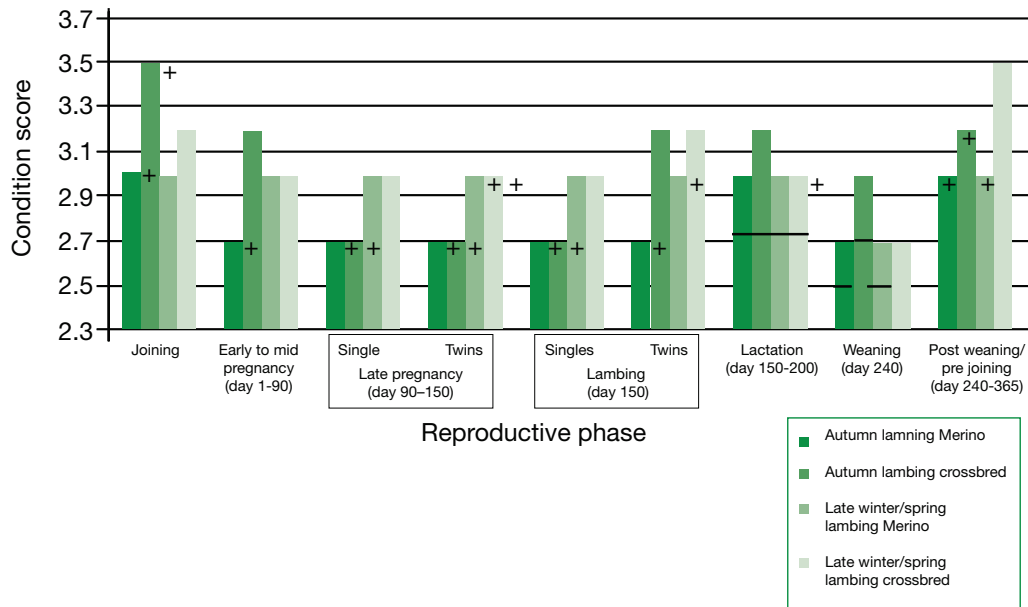
**Table 3.2 – Minimum pasture quantity (kg green DM/ha) benchmarks required to maintain satisfactory production levels of sheep**

Livestock class	Pasture digestibility		
	75%	68%	60%
Dry sheep	400	600	1,200
Pregnant ewes			
– mid	500	700	1,700
– last month	700	1,200	ns
Lactating ewes			
– single	1,000	1,700	ns
– twins	1,500	ns	ns
Growing sheep			
% of potential growth			
– 30 (75c/day)	400	700	1,700
– 50 (125g/day)	600	1,000	ns
– 70 (175g/day)	800	1,700	ns
– 90 (225g/day)	1,600	ns	ns

ns = not suitable

	Reproductive phase	Autumn lambing		Late winter/spring lambing	
		Merino	Crossbred	Merino	Crossbred
1	Joining	3+	3.5+	3	3.2
2	Early to mid pregnancy (day 1–90)	2.7+	3.2	3	3
3	Late pregnancy (day 90–150)	Singles 2.7+	Singles 2.7+	Singles 3	Singles 3
		Twins 2.7+	Twins 2.7+	Twins 3+	Twins 3+
4	Lambing (day 150)	Singles 2.7+	Singles 2.7+	Singles 3	Singles 3
		Twins 2.7+	Twins 3.2	Twins 3+	Twins 3.2
5	Lactation (day 150–240)	2.7–3	2.7–3.2	2.7–3	2.7–3+
6	Weaning (day 240)	2.5–2.7	2.7–3	2.5–2.7	2.7
7	Post weaning/Pre joining (day 240–365)	3+	3.2+	3+	3.5

**Condition score targets for the seven phases of the reproductive cycle of ewes**



## References

Meat & Livestock Australia and Australian Wool Innovation Ltd, 2008, Making More from Sheep, Module 10, Wean More Lambs.

Langford C., Alcock D., Holst P., Shands C., Casburn G, 2004, Wean More Lambs, Meat & Livestock Australia, Sydney.

Court J. (Ed), 2006, Drought Feeding and management of Sheep, A guide for farmers and land managers, Department of Primary Industries.

Wool Press magazine, Feb 1998.

## Appendix 3.1 - lifestimewool condition score yard book

Using the condition score yard book, record the condition score of each sheep with an 'X' on the chart. Once you have condition scored 25-50 sheep add up the columns and divide by the total number of sheep assessed to calculate the average CS for the flock. The advantage of using this yard book is that it gives a good representation of the spread of CS in the mob. In the example below, the average, it is 2.8.

Figure 3.16 – Condition score yard book example

15									
14									
13									
12									
11									
10									
9									
8					x				
7					x				
6				x	x				
5				x	x	x			
4				x	x	x			
3			x	x	x	x			
2		x	x	x	x	x			
1		x	x	x	x	x	x		
	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0

**lifetimewool: 'Measure to manage'**  
Condition score notebook

**Mob:**                      **Date:**                      **Median:**                      **No:**

20										
19										
18										
17										
16										
15										
14										
13										
12										
11										
10										
9										
8										
7										
6										
5										
4										
3										
2										
1										
CS	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	TOTAL
TOTAL										
Average CS = TOTAL / No ewes										