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PROGRAZE™

Profitable, sustainable grazing

SEGMENT 4

SHEEP BREEDING PACKAGE

In this segment you will learn:

- How to fat score sheep.
- How fat scoring is used, in conjunction with pasture benchmarks, to manage the nutritional requirements of the ewe flock through the annual breeding cycle.
- The appropriate management of ewes, rams and weaners through the breeding cycle.
- How the level of pasture intake by sheep influences wool growth and quality.

SHEEP BREEDING PACKAGE

Improving the productivity and viability of sheep breeding enterprises relies on a good understanding of feed requirements over the year. These requirements must be matched to available pasture, pasture improvement and, at times, the judicious use of supplements.

WHAT ARE THE TARGETS?

The aims of a sheep breeding program can be summarised as:

- Optimising per hectare production of wool and lambs.
- Meeting market specifications for the products (wool, meat, surplus sheep).
- Being cost efficient.

The keys to achieving these aims are:

- Skills in pasture assessment.
- An understanding of nutritional requirements of livestock.
- Use of pasture assessment to identify paddocks which will most effectively achieve flock fat score or liveweight targets.
- Skills to monitor fat scores.
- Use of fat scores to assist in setting nutritional requirements for the breeding flock.
- Skills to 'wet and dry' ewe's udders at marking.

In a breeding program particular emphasis is placed on:

- Preparation of the rams.
- Fat score of ewes at weaning.
- Fat score pre lambing.
- Nutrition during lactation.
- Weaner growth.

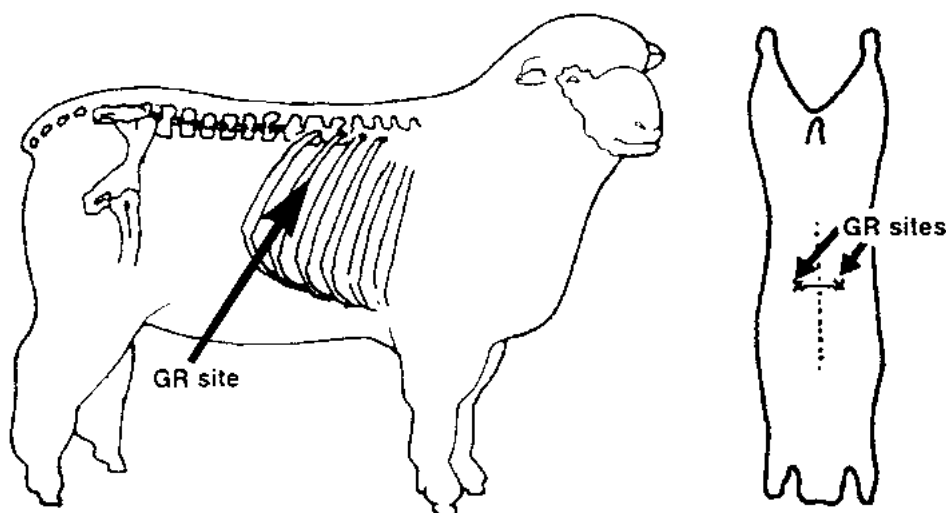
FAT SCORING SHEEP

Fat scoring is carried out on standing, relaxed animals and involves feeling the amount of fat over the long ribs. The specific location is about 10–11cm from the midline on the second last long rib (just before the short rib or loin area). In this location, fat is the main tissue and is a good indicator of general fatness.

Unlike cattle, visual assessment of sheep can be quite misleading and so for accuracy, requires careful palpation of the ribs. Make your main fat score assessment based on the long ribs.

Fat scoring firstly involves identifying the area on the sheep to place your hand (see Figure 4.1). Get your fingers through the wool onto skin level. Apply some downward pressure and move your fingers over the ribs. The amount of 'boniness' will determine the score. Scores and a description of each score are listed overleaf.

Figure 4.1. Use the long rib site for fat scoring sheep.



Description	Score
Individual ribs are easily felt and no tissue can be felt (sliding) over the ribs. Depressions are quite obvious between ribs.	1
Individual ribs are felt with some tissue able to be felt over the ribs. Depressions between ribs are obvious.	2
Individual ribs can still be felt but they are more rounded, with tissue movement being felt over the ribs. The depression between ribs is less obvious.	3
The ribs can just be felt, with no depression between the ribs. Tissue movement over the ribs is apparent.	4
Ribs cannot be felt.	5

MANAGING THE BREEDING PROGRAM

A positive relationship exists between liveweight and the fat content of sheep. Within a flock or between flocks of a similar frame size heavier ewes mean fatter ewes. Fat levels can be assessed by fat scoring and liveweight by weighing.

Fatter ewes at joining mean more lambs born. Table 4.1 demonstrates the association between fat score at joining and the number of scanned lambs per 100 ewes. Note that it is an average 13 foetus for each change in fat score for merinos (the figure would be higher for meat ewes). This average came from the three NSW sites in the Life Time Wool project over 2004 and 2005 joinings. The range in NSW was 6 to 20 foetuses per fat score. It is important that the responsiveness of your flock is known. This determines the pay back in extra lambs from your management and feeding input. Read Primefact 309.

Table 4.1. Effect of increasing fat score at joining on percentage of scanned lambs per 100 ewes.

Fat score	Lambs scanned per 100 ewe Merino
2	108
3	121
4	135
5	148

For the period from weaning to joining, emphasis should be directed towards getting ewes in the right fat score for joining. The target is a fat score 3 for merino and 3.5 for meat ewes in average years. In tough seasons the target will be lower but not below 2.5 merino and 3 for xbred.

A number of factors influence the condition of ewes at joining. They include:

- Ewe condition at the previous weaning.
- Length of time between the previous weaning to the next joining.
- Pasture quantity and quality.

The most critical factor for conception rates in mature ewes is the fat score at joining rather than the ewe's weight gain or loss prior to joining.

Ewe condition at weaning

Lactation represents the most nutritionally demanding period for ewes. For example, a lactating ewe can require up to three times the energy necessary to maintain her when she is dry. To satisfy this demand it is common for ewes to lose weight and decrease fat score.

A weight loss of 5 kg (6.5 kg is approximately 1 fat score) is not unusual and up to a 10 kg loss has been recorded in crossbred ewes experiencing poor pasture conditions during lactation.

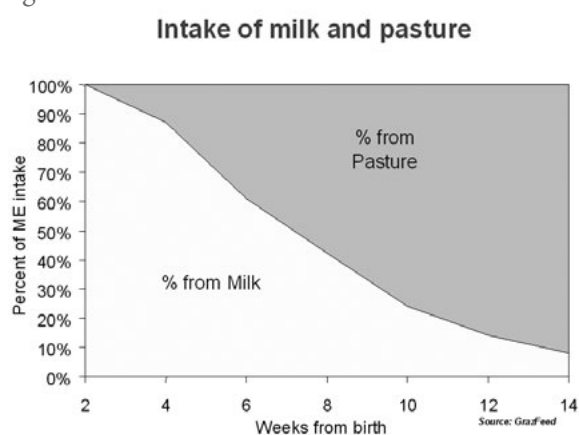
The extent of the loss of condition is controlled by the quantity and quality of pasture or supplement consumed during lactation. If your pastures for lactation are below the benchmarks in Segment 2, substantial weight loss can occur. If the Segment 2 pasture benchmarks are achieved, ewe's fat score at weaning can be the same as at lambing.

Weaning to joining

The longer ewes have between weaning and joining, the greater the opportunity to improve fat score. The period between lambing and weaning can often be increased by restricting the joining period to 6 weeks and weaning lambs when the oldest is 14 weeks.

By 7 weeks of age lambs obtain more of their energy requirements from pasture than they do from milk (see Figure 4.2). By 12 weeks the contribution from milk is relatively small, meaning lambs can be weaned and still maintain their level of production provided the weaning paddock has adequate digestibility.

Figure 4.2. The relative change in intake between milk and pasture with increasing lamb age.



The type of pasture provided to ewes between weaning and joining will obviously influence their condition at joining time.

Where seasonal conditions result in restricted pasture, consideration can be given to drafting off the lower fat score ewes at weaning i.e. below 2.5 fat score, for preferential treatment.

The cost effectiveness of supplementary feeding to achieve a fat score increase depends on the responsiveness of the flock and the price of the feed/grain. Even in low responsive flocks, supplementing to prevent weight loss, below fat score 2, is profitable. As ewes decline below fat score 2 they approach the point of being a dry ewe, resulting in a marked reduction in the number of lambs born. It rarely pays to supplement ewes if they are in the target fat score range for joining.

Ram management

To ensure a successful joining there are a number of factors that need to be considered:

- Rams should be in 3.5 (max) fat score at joining time, because they often lose considerable liveweight and fat score during joining. As the mature weight of rams increases more stress is applied to the back legs at joining hence ensuring ram are not too fat is more important. The rate at which rams are breaking down is increasing. Check rams at least 3 months prior to joining to allow for corrective action.
- Ideally, rams will be joined with 3–4 months wool growth as this helps moderate body temperature changes.
- Rams need to be in good health prior to joining. Careful planning is required to avoid flystrike or post shearing infections which can cause infertility. As well, the rams drenching program should be completed prior to mating. Freedom from Brucellosis needs to be ensured, test if a risk of infection exists.
- To ensure adequate sperm production, rams should have a scrotal circumference of at least 28 cm at the time of joining. The sperm development cycle is approx 42 days, so the 2 months prior to joining is critical for ram health.

Joining

Ewe flocks which have reached target fat scores by joining need not be with the rams any longer than 6 weeks in the autumn breeding season and 8 weeks outside the season. 5 weeks is increasingly being used for autumn joining with little impact on marking percentages.

More than 70% of ewes joined in the breeding season (autumn), which have reached the fat score target range, can be expected to conceive within the first cycle (17 days) of joining. The remainder will be served in the second cycle with very few left to conceive during the last week of a 6 week joining.

Outside the breeding season ewes will come on heat less regularly. When they do, it will be for a shorter time. An additional 2 weeks (8 weeks joining) may be considered. Ram harnesses are valuable for monitoring joining progress and are strongly recommended when joining out of season. The 'ram effect' can be used to concentrate lambing, this is especially useful in spring joinings.

By using these strategies ewes have about 4 months to achieve their target fat score for joining. Given reasonable seasons these targets should be achieved without having to place ewes on the best pasture, these being reserved for high demand livestock such as weaners or finishing stock.

Joining to lambing

In making decisions about management during pregnancy a producer will be faced with differing strategies depending on the fat score of the flock at joining: Add 0.5 score to the numbers below for meat ewes.

- Flocks at fat score 5 must lose weight during pregnancy.
- Flocks at fat score 4 will not be disadvantaged from managed weight loss.
- Flocks at fat score 3 should maintain weight
- Flocks below fat score 3 should increase in weight or at least not lose any more.

Where weight loss is to occur, the strategy should be implemented slowly in the first two months following the end of joining and certainly completed before the month preceding lambing (see Figure 4.3). Rapid nutritional changes may adversely affect both pregnancy and wool quality.

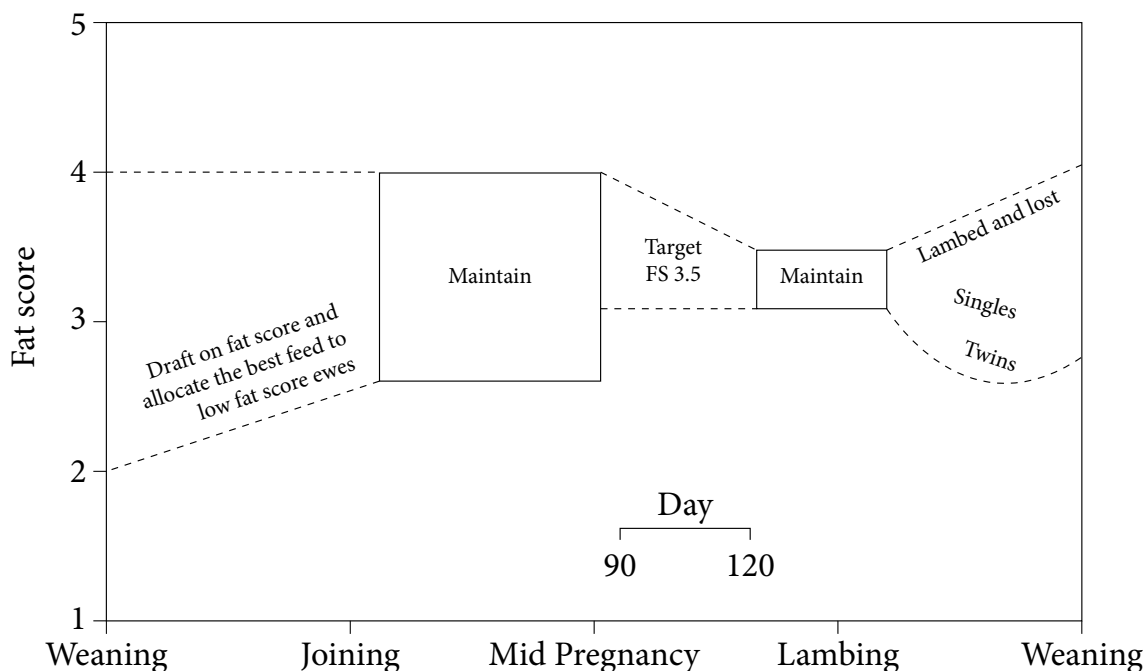
A fat score target, in the range of 3–3.5 (merino), should be the objective for ewes on the point of lambing. Where foot abscess is likely to occur it is better to target 3 as the lower weight decreases the risk of abscess developing. Managing the foot abscess is critical as it predisposes ewes to pregnancy toxæmia and loss of the ewes and her lamb/s. The foot abscess risk is greater in twins than singles.

Aim for 3 FS for merino ewe carrying singles joined to terminal sires. Meat ewes in FS 4.5 or better when run on grazing crops prior to lambing are increasingly having pregnancy toxæmia problems due to being too fat.

If at the conclusion of joining, substantial variation exists in fat scores, drafting on fat score allows management to better cater for the specific needs of ewes and to make more efficient use of pasture. Managing ewes based on singles or twins is better than on fat score.

During the last month of pregnancy ewes should gain at least 4 to 6 kg in liveweight to compensate for foetal development. This should ensure maintenance of fat score over this time.

Figure 4.3. Fat score targets for ewes.



Pregnancy is commonly associated with periods of low pasture growth. Nutritional requirements of the pregnant ewe need to be satisfied, while at the same time ensuring adequate pasture (both quality and quantity) is available for lambing.

Grazing management can be used to regulate pasture intake and ration pasture to ewes to help offset the period of low pasture growth. This will be discussed later in this manual.

Supplementary feeding is used through pregnancy to supplement periods of low pasture production. The critical period is the last 3 weeks of pregnancy and mainly for twins. Seasonal conditions will control the quantity that needs to be fed. Pregnancy scanning allows pasture and supplementary feeding to be targeted to the right ewes. Scanning for wet and dry only, does not allow the different pregnancy needs of singles and twins to be targeted decreasing the pay back from the scanning.

Lambing to weaning

Lactation is nutritionally the most demanding period for the breeding flock. It is desirable that lactation coincides with a peak in pasture production.

It is important that the best use is made of peaks in pasture production to achieve maximum ewe and lamb production. If high levels of livestock productivity are not achieved during these periods it is going to be difficult to reach fat score and liveweight targets in the future without using high cost supplements.

The pasture target for lambing paddocks should be a minimum of 900 kg green DM/ha. As the start of lambing is usually timed to coincide with the increase in seasonal pasture growth rates, the aim should be to build herbage mass levels to 1500–1600 kg green DM/ha by 4 weeks into lactation. If lambing is not in the growing season then supplements in the first 4 weeks of lactation are critical to achieve reasonable lamb weights.

Ewes are best set stocked for lambing. Following lambing, high lamb growth rates are achieved via set stocking or a slow rotation. Under any grazing system it is important to aim for the herbage mass to be maintained around the 1500 kg green DM/ha benchmark if lambs are to exhibit near to maximum growth rates. The legume content should be above 15% on a dry matter basis.

As stated earlier, lambing often coincides with a peak in pasture growth. If ewe and lamb production targets are to be achieved, pastures should remain in a vegetative (green leaf) state as long as possible. If pastures become tall and rank, digestibility will decline and so will livestock performance, especially the lambs.

To maintain control of pastures during periods of rapid growth it will be necessary to increase the stocking density on some paddocks to ensure they remain in the vegetative state. Combine mobs of ewes at marking time. This results in your stocking density better matching pasture growth rate. Initially lambing paddocks are usually stocked based on low winter pasture growth rates; this leads to a big imbalance by mid lactation, hence the need to change stock density during lactation. Low pasture digestibility in late lactation has a negative impact on lambs because by that stage the majority of their requirements are being met by pasture. Improved weaning weights can be achieved solely from a management decision with no added expenses.

WEANER GROWTH

The survival and growth of weaned lambs, is an important issue influencing the viability of breeding enterprises.

While it is important in the post weaning period for ewes to regain liveweight lost during lactation, weaners still have priority over ewes for the most productive pastures.

Managing pastures to maximise the duration of the vegetative stage, and so pasture digestibility will benefit weaner growth and production. The first 4 weeks post weaning are critical. Often weaners lose weight in this period increasing the risk of worm problems. Training lambs to eat supplements while still on the ewes is recommended, 6 feeds in the last 2 weeks of lactation is a minimum.

Worms often reduce weaner performance. Apart from following a strategic drenching program, decisions relating to grazing management will also determine the effect worms have on weaner production. Worm testing will lead to more effective drenching (see Segment 7).

Weaning at 14 weeks removes lambs off pasture which is likely to be highly contaminated by worm larvae. Lambs should be weaned onto 'safer' paddocks, those previously grazed by cattle or adult dry sheep (see Segment 7, Grazing for worm control). The build-up of a weaner's resistance to worms is achieved by ensuring they continue to grow. Aim to get the weaners to an average of 25 kg as soon as possible after weaning. Weight gain from weaning for 1 month will decrease weaner mortality. This will often require a protein supplement. Water quality is critical for weaners, poor water quality will lead to reduced feed intake and this starts a downwards spiral usually resulting in death due to worms.

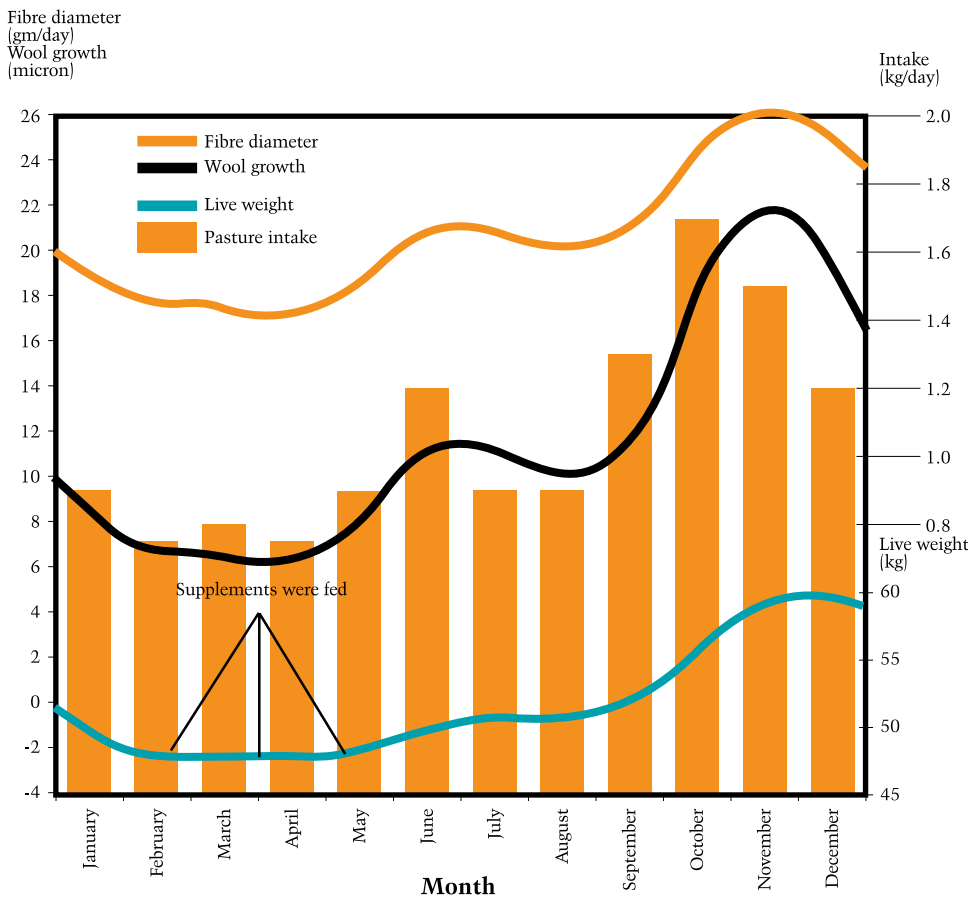
WOOL GROWTH

While this segment's major focus has been on management influencing the flock's reproductive performance, the effect of grazing management decisions on wool production and quality must not be ignored. There is a direct relationship between pasture intake and wool growth. Pasture characteristics influencing intake were discussed in Segment 2.

Figure 4.4 shows the results of a simulation using CSIRO's GrassGro. The simulation is based on a wether flock stocked at 10 wethers per hectare grazing a perennial/annual grass/subclover pasture at Yass on the Southern Tablelands of NSW.

The figure shows the relationship between pasture intake and changes to body weight, wool growth per day and the average fibre diameter for each month's wool growth. Note that as the pasture intake declines the

Figure 4.4. Relationship between pasture intake and production characters in wethers.



production characters, moving together, also decline; animals lose weight, wool growth per day slows and the fibre becomes finer, conversely as pasture intake improves due to increases in herbage mass and/or digestibility, the wool characters increase.

With regard to tensile strength, fibres break at their finest point. In addition, the larger the range in monthly fibre diameters the lower will be staple strength. With regard to the staple strength test (N/Ktex), the finest point of the fibre influences the Newton reading

and the rest of the fibre influences the KTex reading. An understanding of how the staple strength test works helps in managing for improved tensile strength ie do I manage the finest point or the broadest point? Sudden changes in fibre diameter will cause a lower staple strength than a gradual decline.

Ewes lambing on an herbage mass below the benchmarks may rear a lamb but the penalty, apart from the likelihood of considerable weight loss in the ewe and lowered lamb growth, could be tender wool.

SUMMARY

Weaning to joining

Livestock targets

- Ewes – merino ewe 2.5 to 3 FS, meat ewes 3 to 3.5 FS by joining. Draft off ewes below FS 2.5 and supplementary feed in tough years to lower the dry ewe percentage
- Weaners – the first month post weaning is critical. Aim for a minimum weight gain of 0.5 kg/week until the weaner has reached 25 kg (merinos). Growth rates in xbred lambs will be driven by your marketing plan.
- Maiden Ewes – achieve liveweight targets by their first joining, minimum of 42 kg medium frame Merinos, and 47 kg for large frame Merinos and 50 kg crossbred ewes. These target weights also apply when joining ewe lambs.

Grazing management

- Wean lambs onto 'safer' worm pastures – ideally, pasture previously grazed by cattle or dry adult sheep.
- Weaners receive preference for pasture with potential for high livestock production.
- Hogget ewes generally receive second preference to weaners for quality pasture, followed by the mature ewes.
- Following weaning, consider drafting ewes on fat score.
- Supplements should be used to prevent mature ewes declining below fat score 2 for joining, and to ensure weaner and hogget ewes meet fat score/liveweight targets. Consider 'flushing' ewes prior to joining with short term supplement of lupins or green pasture/ lucerne to increase ovulation rate and the number of ewes cycling (if below 2 score).

Joining to lambing

Livestock targets

- The targets are 2.5 to 3 FS for merinos and 3 to 3.5 FS for meat sheep. Use pastures to achieve the top end of the FS range in as many seasons as possible. In tough years accept the ewes will be in the lower end of the range.
- In foot abscess areas aim to have ewes no more than FS 3 (M) FS 3.5 (MS) at lambing to help manage the problem. This could involve losing weight immediately after joining.

Grazing management

- Identify lambing paddocks early and plan to achieve a minimum of 900 kg green DM/ha accumulated in them by lambing, varies for twins and singles.
- Fodder budgeting provides the information to ration limited pasture supplies specifically to meet the needs of lambing ewes.
- While this period often coincides with a low seasonal pasture growth, target at least some growth in last year's weaners, 1.5 kg/month. Even low weaner growth rates should ensure the development of significant levels of worm resistance.

Lambing to weaning

Livestock targets

- Optimise lamb growth rates especially post marking.
- Optimise hogget growth rates to ensure target liveweights are met for joining.

Grazing management

- A minimum pasture benchmark of 1500–1600 kg green DM/ha 1 month after lambing for both ewes and lambs.
- Identify weaning paddocks early. Plan to achieve an herbage mass in the range of 1500–1800 kg green DM/ha and low worm status for weaners.

Where necessary, lift stocking density at lamb marking to ensure paddocks do not become rank and lose quality. If possible, maintain herbage mass below 1800 kg DM/ha. This could involve 3 lambing mobs combined into 1.

Further reading and information

- *The sheep business: prime lamb production and marketing guide for NSW.* NSW Agriculture (Booklet).
- *Livestock feeding on pasture.* New Zealand Society of Animal Production. Occasional Publication No. 10. Hamilton, New Zealand.
- www.dpi.nsw.gov.au
 - Primefact 151 – *Fat score at joining: the benefits of optimal nutrition.*
 - Primefact 309 – *How responsive is the conception rate of your merino ewes?*
 - Primefact 308 – *Maiden merino ewe conception rates.*
 - Primefact 807 – *Why fat score breeding ewes.*