NEW SOUTH WALES
LIFETIMEWOOL
MAXIMISING THE GENETIC POTENTIAL OF YOUR FLOCK

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INSIDE

HIGHLIGHTS

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The impact of being born a twin

Understanding flock variability - the key to optimising ewe nutrition.

Understanding the variation in fat score between sheep within a flock can assist decision making to maximise benefits from the Lifetime Wool project and improve overall flock performance.

Within a mob of sheep all quantitative traits (ie those controlled by many genes) such as liveweight, fat score, wool growth and fibre diameter will have the normal or bell-shaped distribution (Figure 1). The distribution of fat score within a group of ewes clearly indicates where the mob sits at present and either the challenges to be addressed or opportunities to be taken to optimise ewe nutrition for that flock.

The flock of ewes depicted in Figure 1 were grazing on the Central Tablelands of NSW and had an average fat score of 3 at mid-pregnancy. As a mob, these ewes are right on target. However about 20% of ewes in this mob are below fat score 2.6 and 20% are above fat score 3.3.

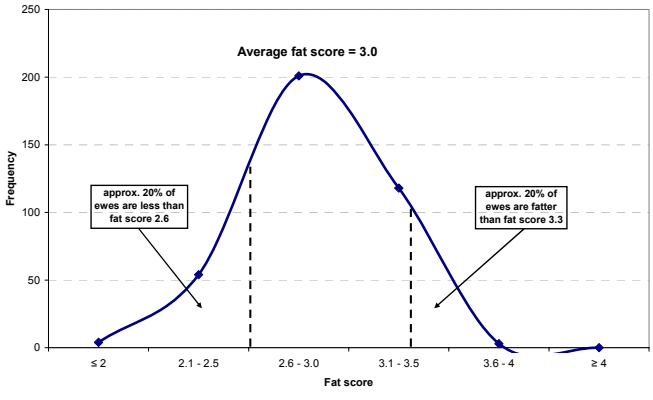

Figure 1 Distribution of fat score in a mob of ewes at mid-pregnancy on the Central Tablelands of NSW.

The challenge or opportunity within this mob is to increase the fat score of the 'thin' ewes prior to lambing without increasing the fat score of the 'fat' ewes.

To optimise the nutrition of this flock, splitting them into two groups 'thin' and 'fat' and providing the 'thin' ewes with access to better feed (either pasture or supplements) while managing the 'fat' ewes to maintain their condition is required.

Increasing the pasture available or the provision of supplements to the 20% of the ewes that are 'thin' has the potential to significantly boost both the marking and weaning percentages of this flock.

This example highlights one particular time of the breeding cycle at which knowledge of the variability occurring in the mob can be used to improve the overall reproductive performance of the mob. Similar opportunities will be present at other stages of the reproductive cycle (ie prior to joining, at pregnancy scanning, prior to lambing and weaning).

The Lifetime Wool project is providing information on just how knowledge of the variability within a mob can be used to optimise both the reproductive outcomes of the ewe and the lifetime wool production and quality of her progeny.

Actively monitoring the condition of ewes during the breeding cycle, through fat scoring or weighing ewes at the key stages of the reproductive cycle is essential to capitalise on opportunities to optimise ewe nutrition.

What are the fat score targets to aim for and when?

Peter Johnson, NSW DPI Livestock Officer (Sheep & Wool) Orange

Fat score is a much better indicator of the body condition of a sheep than body weight. In any mob, there is a variation in frame size, which can lead to large differences in body weight.

Fat score is a way to consistently indicate the fat reserves on an animal no matter how big or small the animals frame.

Fat score is taken on the GR site, which is 11cm, or about a hand width down the 12th or second last long rib from the backbone (Figure 2). This site is used as it is predominantly fat that collects between the rib and the skin, not muscle.

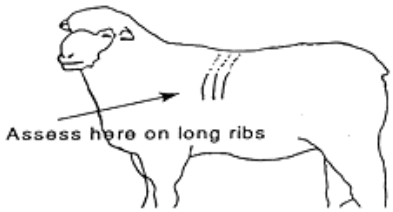

Figure 2.The best site for assessing fatness is over the ribs. (Source: Fat scoring sheep and lambs NSWDPI Agnote DAI-258 first edition)

By palpating this site, you can estimate the thickness of fat over the rib and assign a fat score from 1 to 5 (Table 1).

Table 1 Manual assessment criteria and GR tissue depth for each fat score.

Fat score	Manual assessment over the long ribs	GR tissue depth (mm)
1	Individual ribs felt very easily; cannot feel any tissue over the ribs	0 - 5
2	Individual ribs easily felt, but some tissue present.	6 - 10
3	Individual ribs can still be felt, but can feel tissue.	11 - 15
4	Can just feel ribs and fluid movement of tissue.	16 - 20
5	Ribs barely felt, tissue movement very fluid.	> 20

(Source: Fat scoring sheep and lambs NSWDPI Agnote DAI-258 first edition)

By using fat score targets for your breeding ewes; you can get the best results from them physiologically which will hopefully in the end be better for you financially. Fat score drives ovulation rate to a certain point, and as the Lifetime Wool Project is demonstrating, ewe fat score during pregnancy also has a lifelong effect on the wool traits of the ewe's progeny.

Generic best practice fat score targets for keeping breeding ewes performing to their maximum capability are shown in Figure 3. The period between weaning of last years lambs and joining this year is used to bring all of the ewes back in line with each other. This is done by allocating the best feed to ewes with the lowest fat score, which are usually the animals that have reared twins. By the time joining starts, the best outcome is to have ewes between fat score 3 and 4.

Mid-pregnancy is a good time to try and reduce the ewes that are sitting at a fat score 4 down to 3.5 to minimise the chances of birthing difficulties. This is the last 'safe' time to reduce the fat score of the ewe during pregnancy. From day 100 through to lambing, it is best to keep the ewes between a fat score of 3 to 3.5. Once lambing occurs, there will be a spread in fat scores as those that have lambed and lost put on weight, while the lactating ewes feeding twins will lose a substantial amount of weight.

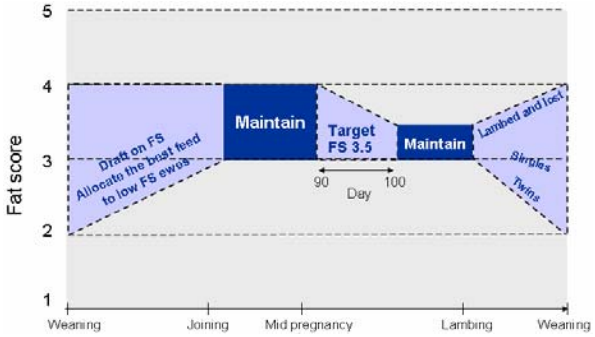

Figure 3 Best practice fat score targets and range for breeding ewes during the year. (Source: Wean More Lambs, MLA 2004)

There will be slight differences in these targets depending on where you are in NSW. Monitoring the Lifetime Wool paddock-scale site 'Kialami' at Armidale on the Northern Tablelands has shown that ewes need to be at least a fat score 3.5 at joining at the end of summer to make it through the autumn to maintain a fat score 3 in mid-pregnancy. If animals are any lower than 3.5, it is not cost effective to increase weight after this time.

Monitoring at the Lifetime Wool 'Carwoola' site in the Southern Tablelands is still trying to deduce whether an optimum fat score from joining to mid-pregnancy should be 3 or 3.5 considering the costs of achieving these targets in that environment.

Pasture benchmarks - What are they and why are they important?

Jane Mason, NSW DPI Livestock Officer (Sheep & Wool) Forbes

Throughout the year, the amount of available pasture to stock varies in response to many factors such as rainfall, temperature, paddock history and livestock activity. Animal production is heavily dependant on the nutritional resources available. In a grazing system, this is represented by both the quality and quantity of green pasture on offer. Pasture quality and quantity are defined in terms of benchmarks.

Pasture benchmarks are described as the amount of pasture required to satisfy the nutritional requirements of stock at various stages of their reproductive cycle, and for growth. The benchmarks required to achieve certain levels of production are influenced by the quality of the pasture. In essence, an animal will need to eat either a greater quantity of pasture that is lower in quality to maintain condition or alternatively, eat less pasture that is relatively high in quality to achieve the same outcome.

Pasture quality is described in terms of pasture *digestibility* and the proportion of *legume* present. The digestibility of a pasture is the proportion of animal intake that is actually used by the animal for its body processes and not excreted. Legume content plays a role in pasture quality in that legumes are superior to grasses in terms of protein content and at the same

stage of growth, will be of a higher digestibility than grasses. Intake (i.e. the amount of pasture consumed by an animal) will, therefore, be higher on pastures with higher proportions of legume.

The quantity of available pasture is described in terms of *herbage mass*, measured in kilograms of dry matter per hectare (kg DM/Ha).The term *dry matter* is used, in order to eliminate the effects of moisture content in a pasture, which is variable throughout the life of a pasture plant. It is the *green* component of dry matter, as opposed to dead, that has nutritional significance in terms of improving production.

If certain levels of production are to be reached throughout the year, such as particular fat score targets, it is advantageous to understand the pasture benchmarks required to achieve these targets. Any planning and management strategies that need to be established in order to do this can then occur in advance.

Pasture benchmarks only provide 'ball park' estimates for the minimum green herbage mass to which stock can graze and still maintain satisfactory levels of production. There are many factors that influence the determination of herbage mass. These are pasture height, density and dry matter. The 'sample' pasture on which pasture benchmarks are based is one which is green, reasonably dense; the first 3 cm of height equating to about 1000 kg DM/Ha, with each centimetre after that representing about 200 Kg DM/Ha (PROGRAZE™ manual, NSW DPI, 2003).

The ability to identify the quality and quantity of pasture in a paddock has other benefits aside from improving animal performance. Such benefits include identifying paddock feed shortages and surpluses. This has ramifications in deciding when supplementary feeding will be necessary, such as that which may occur when conditioning ewes to fat score 3 at joining.

Grazing management decisions can also be made, such as calculating how long a paddock will last a mob before feed supply runs short or until over-grazing occurs. Over-grazing has an effect on botanical composition in the next year with the potential for weed invasion, problems for individual pasture plant survival and the overall sustainability of the grazing system.

Therefore, using pasture benchmarks not only assists in improving animal performance, it also plays a major role in being the basis for pasture management strategies and can influence decisions that will impact upon natural resource sustainability. The pasture benchmarks required for certain levels of production for sheep will be in the next issue of *NSW Lifetime Wool*.

Feed budgeting - an essential tool for matching animal performance with pasture availability

Phil Graham, NSW DPI Livestock Officer (Sheep & Wool) Yass

Feed budgeting is a very useful tool during the pasture growing season, to provide a picture of likely pasture feed outcomes in the near term.

Feed budgets match animal production requirements with estimates of available pasture benchmark targets and can be used to determine stocking rate, grazing days or to identify pasture surpluses or deficits.

Preparation of feed budgets for breeding ewes is essential as the nutritional requirements of the ewe differ substantially at various stages of the reproductive cycle. Strategies can be put in place to ensure that fat score targets which will optimise ewe reproductive performance at various time of the year are met through available pasture or supplements are provided as required.

A feed budget can be for a particular paddock/s or for the whole farm. The budget period is generally set by the nutritional requirements of your flock, eg late pregnancy or prior to weaning to ensure breeding ewes have access to adequate nutrition or post weaning to allow for adequate growth of weaners.

A typical question asked in the Yass area is: *"How will the lambing paddock be in mid August"?*
Given a pasture mass of 300 kg/ha green at Ist July with estimated pasture growth rate of 8 kg/ha/day for July and 15 kg/ha/day for August (based on good local data) with no animal intake as the lambing paddock was shut up due to the late break, a simple calculation will estimate the amount of pasture available for the start of lambing on 14th August.

Starting point + (pasture growth x days) - (animal intake x stocking rate x days) = available pasture at target date.

So for our Yass example:

300 kg/ha green+ (8 kg x 31 days) + (15 kg x 14 days)

= 758 kg/ha green on 14th August.

This is not ideal but it can be tolerated.

A follow up question will then be *"What is the situation by the time the bulk of ewes are lambing at the end of August?"*
Starting with the 758 kg/ha green at the start of lambing:

758kg/ha + (15 kg x 16 days) – (1.25 kg/ha/day x 4 ewes/ha x 16 days).

= 758 + 240 - 80

= 918 kg/ha green on 31st August.

This is starting to achieve the desired benchmark, with the pasture growing away from the ewes. The late break in the Yass region means that supplementary feeding will be required during July and into August, but we won't need to feed during lambing.

What information do I need for feed budgeting and where do I get it?

The starting pasture mass, the planning period and stocking rates are on-farm issues. You will need to obtain pasture growth and animal intake data. Those of you who have done Prograze™, the animal intake data is in Segment 7 and

pasture growth numbers are in the appendix of your manual. If you don't have a Prograze™ manual – ask your local DPI staff or retailer about pasture growth rates.

Animal intake is controlled by the pastures mass and quality. The pasture intakes for either a 50 or 60 kg ewe in late pregnancy are shown in Table 1. These numbers are a guide to ewe intakes in late pregnancy on pasture condition at present. Note they are only a guide - it is impossible to provide numbers for all possible combinations. For other combinations more relevant to your property contact your local DPI Livestock Officer (Sheep & Wool).

Table 1. Pasture intake (kg DM/hd/day) of ewes during late pregnancy for two live weights and three levels of pasture availability.

	300kg/ha green 70% digestibility	500kg/ha green 70% digestibility	1000kg/ha green 70% digestibility
50 kg ewe	0.7	0.9	1.2
60 kg ewe	0.8	1.0	1.4

It is important to note that the data in Table 1 are daily intake figures which indicate how much pasture the ewes are likely to consume each day from the three different levels of pasture availability. They are not what the ewe actually needs. The first 2 pasture masses in Table 1 (ie 300kg and 500kg/ha green) will still require some supplementation to ensure the nutritional requirements of the ewe are met and foetal growth to lambing is not compromised.

The impact of being born a twin.

It is common in Merino flocks to have between 90 and 95 % of ewes in a mob that do get pregnant and of these 20 to 30% will be pregnant with twins. However these percentages are reliant on adequate nutrition and can decrease significantly if the ewes are joined in sub-optimal condition.

Nutrition between conception and lambing as well as shelter and weather at lambing) will ultimately determine how many of the lambs conceived will make it through to weaning and beyond. This is critical for twin born lambs who are more likely than their single born counterparts to die, particularly in the first 48 hours post birth (Figure 4).

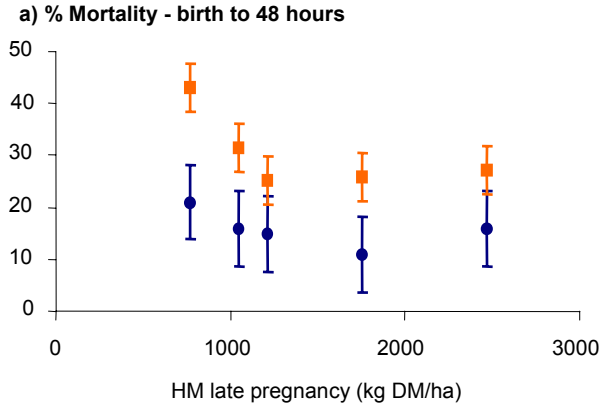

Figure 4. Most lamb deaths occur between birth and 48 hours with twins more likely to die than singles.

Twin born lambs are also less likely to survive to weaning and have lower weaning weights than single lambs. Monitoring at the three NSW paddock-scale sites to date indicates that the bodyweight difference between singles and twins persists up to175 days post-weaning. As a result of competing with their twin sibling for nutrients in utero and the negative impact of this on their developing follicle population, twins will grow less broader wool throughout their lifetime.

The focus of a number of Lifetime Wool co-learning sites in NSW is to determine whether improved nutrition of twin bearing ewes during pregnancy can overcome the impact of a lamb being born a twin. In other words, is it possible to manage the ewe so that her twin born progeny perform as a single and at what cost? The outcome of these on-farm monitoring trials will be published in future issues of *NSW Lifetime Wool*.

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