Measure ewe condition to optimise nutrition

The Lifetime Wool Project was initiated to help wool producers gain a better understanding of how nutrition can affect a ewe's reproduction and the lifetime production and wool quality of her progeny. This is the second article in a 12-part series detailing how wool producers can measure sheep condition and use the information to lift flock profitability.

Wool producers who measure fat score variation among their breeding ewes are well-positioned to take steps to optimise their nutrition and lift flock profitability.

Figure 1 shows a ewe flock in a score 3 condition during mid-pregnancy on the New South Wales Central Tablelands.

As a mob, the ewes are on target for peak reproductive efficiency but about 20 per cent have a fat score of less than 2.6 and 20% have a fat score of more than 3.3.

So, an opportunity exists within this mob to increase the fat score of the thin ewes before lambing without increasing the condition of the fat ewes.

Move away from mob mentality

A producer running this flock could optimise flock nutrition by drafting the mob into thin and fat groups.

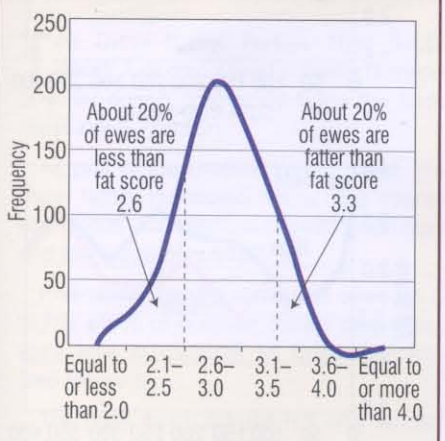
The thin ewes could be given access to better quality feed (pasture or supplements), while the fat ewes would be managed to maintain their condition. This will improve ewe reproduction and allow more effective use of available pasture and/or supplements.

In this example, 20% of the mob represents about 60 ewes which are receiving sub-optimal nutrition during mid-pregnancy.

Increasing the pasture supply or providing supplements to the 20% of thin ewes can boost flock marking and weaning percentages significantly.

Pregnancy is just one opportunity during the breeding cycle where producers can use their knowledge of mob fat score variation to improve overall flock performance.

FIGURE 1 Mid-pregnancy ewe condition*



* On the New South Wales Central Tablelands.

Source: Lifetime Wool Project.

by Sue Hatcher,
NEW SOUTH WALES DEPARTMENT OF PRIMARY INDUSTRIES

Sue Hatcher

New South Wales Department of Primary Industries researchers Michael Lollback (left), Clare Edwards (centre) and Bob Marchant (right) with Kialami manager, John Heffernan (second from left) and Kialami owner, Charles Belfield (second from right).

Similar opportunities are available at other stages of the breeding cycle (such as before joining, at pregnancy scanning, before lambing and weaning).

Actively monitoring ewe fat scores at these stages will allow growers to better target feed availability to ewe nutritional demand.

Road tests

The Lifetime Wool Project has 15 paddock-scale research and demonstration sites throughout southern Australia to 'road-test' the findings of plot-scale research (outlined by Mark Ferguson in the August edition of *Farming Ahead*) on commercial flocks.

Researchers are trialling the influence of environment and genetics on the performance of ewes and their progeny. The trials will add rigour and commercial relevance to ewe nutrition guidelines.

At all sites, 1000 Merino ewes were drafted randomly into high- or low-nutrition groups at about 21 days from the start of joining (see Figure 2).

Researchers measured ewe liveweight and fat score monthly and used the information to adjust grazing pressure and supplementary feeding to achieve one fat score difference between the high- and low-nutrition groups from about day 90 of pregnancy until weaning.

After weaning, the ewes were grazed together and monitored until their next joining to check for carryover effects on their next pregnancy.

Currently, all weaned progeny are being grazed together until 2.5 years of age to measure wool production and quality differences caused by the nutrition given to their mothers before their birth.

Lifetime Wool Project in NSW

The Lifetime Wool Project has been operating in NSW for about 18 months with three trials in the major wool-producing areas. Trials are based at Carwoola Station, 30 kilometres south-east of Queanbeyan; Kialami, 25km west of Armidale; and Oak Hills, 30km south-east of Parkes.

The 2004 drought affected all sites to some degree, especially Carwoola where all breeding ewes were fully ration fed until October 31 (day 200).

At Oak Hills, pasture supplies were minimal so ewes were ration fed until late August (day 150). Kialami was the only NSW site that experienced close to normal conditions.

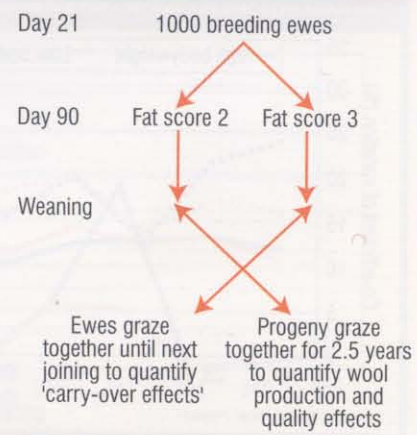
Researchers discovered differences in fat score at all NSW sites, although the timing, magnitude and duration of the differences varied (see Figure 3, page 64).

At Carwoola, a fat score difference between the high- and low-nutrition groups first appeared at day 70. The difference was maintained until just before lambing. The maximum fat score difference was 0.5, with an average of 0.1 between day 90 and weaning.

At Kialami, a fat score difference was achieved from day 55 and maintained until weaning. The largest difference was 0.6, with an average of 0.4 until weaning.

At Oak Hills, a fat score difference was achieved at day 109 and persisted (although at a smaller magnitude) until ewes were

FIGURE 2 Ewe condition targets



Source: Lifetime Wool Project.

joined again during mid-March 2005. The largest difference was 0.8, with an average of 0.5 to weaning.

Conception rate and fat score

In trials, conception rates varied with Oak Hills having a higher conception rate than Carwoola and Kialami (see Table 1).

But NSW ewes were less responsive than the Australian average to improved fat score at joining.

Results from all Australian sites showed that an increase of one fat score at joining resulted in 22 more lambs scanned per 100 ewes (6–30 lambs/100 ewes).

Factors such as genetics, the environment and management all influence how fat score will affect a ewe's conception rate.

Knowing the genetic potential of a flock to achieve high conception rates will help producers optimise the production potential of a ewe and her progeny.

TABLE 1 Ewe conception rate (foetuses scanned/100 ewes) and condition scores*

	Lambs scanned per 100 ewes		
	Fat score 2–2.5	Fat score 3–3.5	Difference
Carwoola	81	87	+6
Armidale	101	106	+5
Oak Hills	130	126	–4

* For the three NSW Lifetime Wool Project sites.

Source: Lifetime Wool Project.

Wool producers can check the genetic potential of a flock by scanning ewes between 75 and 90 days from the start of joining for twin or single foetuses and comparing the results with the ewe fat scores at joining.

Progeny survival to weaning

On average, regardless of nutrition during pregnancy, twin-born lamb survival to marking was about 20% lower than single-born lambs (48% versus 69%) (see Table 2).

But when marked, twin-lamb survival to weaning was similar to single-born lambs regardless of ewe nutrition during lactation.

Ewes with access to high nutrition levels during pregnancy reared 10% more lambs to marking than ewes offered low nutrition (64% versus 54%).

Progeny growth

Progeny marked from the high-nutrition group were 3kg heavier than the low-nutrition group.

Ewes respond differently to ration feeding

Feeding sheep according to their fat score has ensured a better match between sheep nutritional needs and feed offered at Carwoola Station, Bungendore, New South Wales.

Farm manager Darren Price has discovered fat scoring his ewes has improved feed efficiency. But the sheep management system has not been without its problems. The 2004 drought followed a tough 2003 season and high- and low-nutrition ewes were fully ration-fed during pregnancy.

The high-nutrition group was given 1kg/head/day of wheat, while the low-nutrition group received 600g/head/day. On average, fat scores in the high-nutrition group increased but not as much as necessary. As grain/head/day increased, fat scores within the mob became more varied.

At lambing, well-fed ewes had fat scores of 1.5-4.0 with a co-efficient of variation of 25% (see Figure 4). But the well-fed ewes would not eat more than 1kg/head/day and tended to waste more grain as the ration increased.

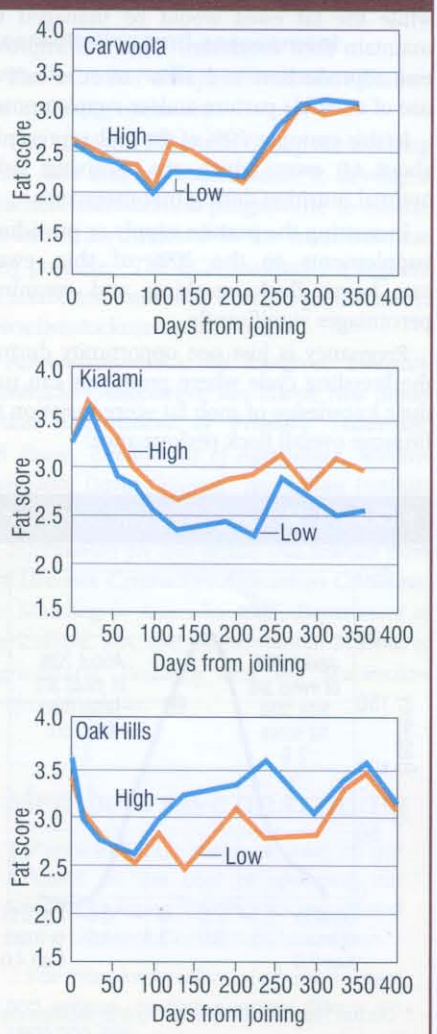
Drafting the ewes into fat score groups and feeding them accordingly would have increased their production. A similar pattern was evident among low-nutrition ewes. At lambing, ewe fat scores were 1.5–4.0 but the co-efficient of variation was about 5% higher than the well-fed ewes. By October, when green feed became available, fat score variation among high- and low-nutrition ewes decreased significantly.

The season broke during lactation allowing ewes from both groups to make an excellent recovery and achieve an average fat score of just more than 3.0 by February 2005.

FIGURE 4 Ration feeding increased condition score variation at Carwoola

Source: Lifetime Wool Project.

FIGURE 3 Fat score profiles



Source: Lifetime Wool Project.

TABLE 2 Lamb survival to marking

		Percentage of lambs marked	
		High-nutrition	Low-nutrition
Carwoola	Singles	82	56
	Twins	22	40
Kialami	Singles	67	61
	Twins	48	41
Oak Hills	Singles	84	66
	Twins	81	59

Source: Lifetime Wool Project.

Single-born lambs weighed significantly more than twin-born lambs at weaning.

While the weight difference reduced over time, single-born lambs weighed more than twin-born lambs at 7–10 months.

Future trials

All lambs have been weaned and checked for wool production and quality, liveweight and growth.

Reproduction rates of all female progeny will be monitored until 2.5 years of age.

The ewes have been joined again to check how their 2004 nutrition (high versus low) from pregnancy to weaning influences their ability to conceive during 2005.

An extension programme is being rolled out for Lifetime Wool in NSW to help commercial wool producers learn how to better monitor their breeding ewes.

Interested producers can compare the performance of thin and fat ewes during pregnancy or identify twin-bearing ewes.

This will enable producers to differentially manage ewe nutrition during pregnancy to determine if it is biologically possible and economically feasible to manage ewes so twin-born progeny perform as well as singles.

Mid-winter shearing proves a problem for twin-bearing ewes

Armidale, New South Wales wool producer Charles Belfield now knows supplementary feeding will be required in most years to keep twin-bearing ewes in peak condition during late pregnancy.

On the Northern Tablelands, most Merino producers join during April and shear in mid-winter to match pasture production with ewe feed demand during lactation.

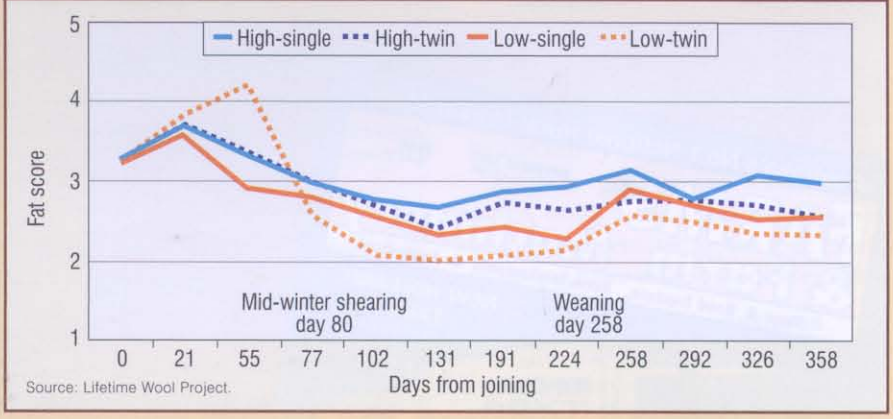
The trade-off is that pasture availability is insufficient during August when the ewes are off-shears during late-pregnancy.

Best practice guidelines recommend ewes are maintained in a score 3 condition during winter from mid-pregnancy to lambing but this is difficult to achieve after mid-winter shearing. Within the high-nutrition group, ewes maintained a score 3 condition until pregnancy scanning (at 100 days) but they deteriorated sharply after mid-winter shearing, particularly the twin-lambing ewes (see Figure 5). The ewes could not eat enough to maintain their condition.

At weaning, twin-bearing ewes, particularly those on a low-nutrition plane during lactation, were half a fat score less than single-bearing ewes or those fed well during the previous spring.

Ewe conception rates are likely to be lower during 2005 if they are not managed preferentially from weaning to joining.

FIGURE 5 Ewes cannot maintain condition score after mid-winter shearing



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For information on the Lifetime Wool Project in NSW contact Sue Hatcher, NSW Department of Primary Industries, via sue.hatcher@dpi.nsw.gov.au or phone (02) 6391 3861. For other information about the Lifetime Wool Project, contact national co-ordinator and Victorian DPI researcher Andrew Thompson via andrew.thompson@dpi.vic.gov.au or phone (03) 5573 0949.

Well-fed ewes appear less susceptible to internal parasite infection

The Dunn family, Parkes, New South Wales, has discovered superior nutrition of ewes during pregnancy helps the flock resist worm infection.

As part of the Lifetime Wool Project, the Dunn family monitored faecal egg counts each month for a sample of ewes given high and low levels of nutrition.

Preliminary results show that ewes on a higher plane of nutrition during pregnancy were less susceptible to worm infection (see Figure 6).

The peak worm burden not only tended to be lower than the low-nutrition ewes but occurred later in the pregnancy.

FIGURE 6 Ewes offered more feed during pregnancy had lower faecal egg counts