

**GROWING GREAT LAMBS  
WORKSHOP RESOURCE BOOK**  
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# INTRODUCTION

In the mid-1990s post-weaning lamb growth rates across New Zealand averaged 80-100g/day. Over the past 20 years these growth rates have improved by approximately 40 grams per head per day.

*Reference: Beef + Lamb New Zealand Economic Service*

Given pre-wean growth rates can be 240-260g/day, there is considerable scope for improving farm returns, by increasing the speed at which lambs are finished. This benefit lies in both the timing of selling lambs and the reduced total feed cost of faster growing animals. The gains before weaning are also significant and often easier to achieve.

There are two key stages to growing great lambs:

- Birth to weaning
- Post weaning.

## Grow your lambs faster—make more money

Growing lambs faster can provide a number of benefits to the whole farm system:

- Lambs are sold earlier and heavier
- More lambs are finished
- Improved ewe lamb replacements (opportunity to mate ewe lambs).



Given the average post-weaning daily growth rate of lambs in New Zealand sits around 80-100g/day, there is plenty of room for improvement

- Because lambs are sold earlier, increased feed available for other classes of stock, e.g. capital stock
- Better feed conversion efficiency—less overall feed is required to achieve target weights
- Lambs are subject to less parasite challenge; many may never require drenching.

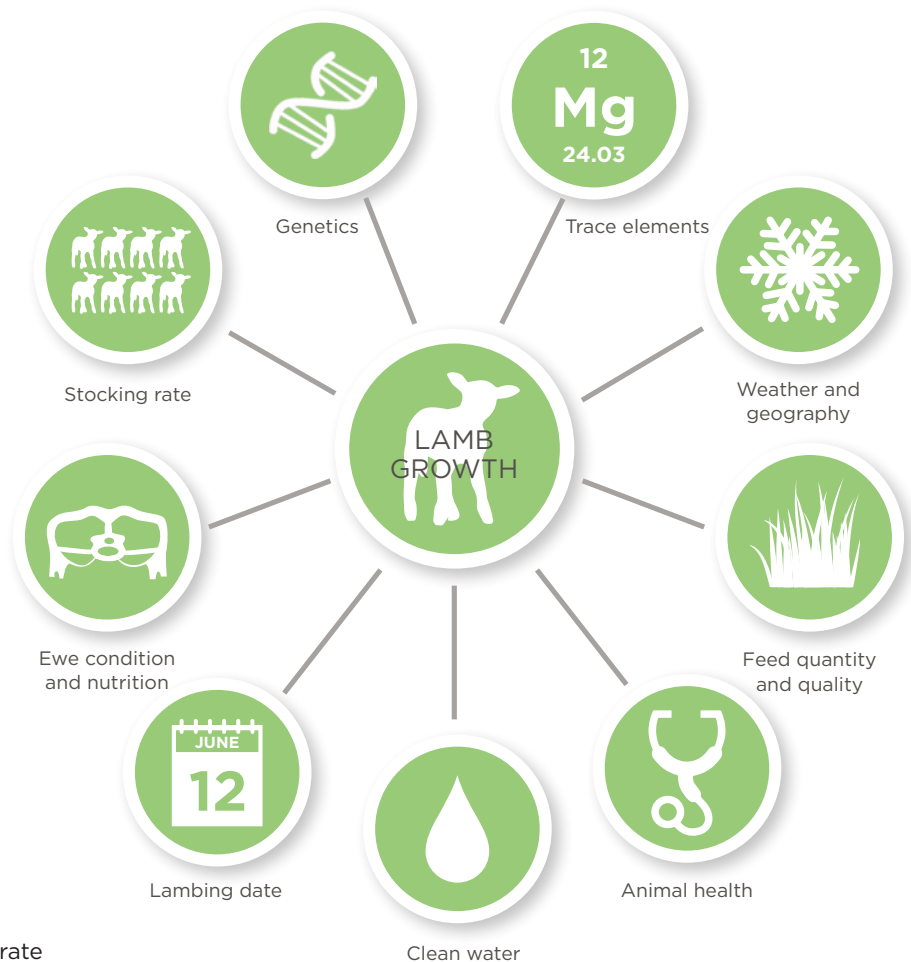
If new-born lambs start their lives well and continue in the same manner, their carcass weight, hogget weight and ewe performance are all enhanced. The decision to improve lamb growth impacts favourably on many aspects of farm profitability. Achieving high lamb growth requires an all-encompassing view of management, as well as planning, to achieve pre-set goals. A systematic approach is required; it doesn't happen automatically.

## GROWING GREAT LAMBS—KEY PRINCIPLES

Many factors interact to affect lamb growth rate, including ewe body condition, ewe milking ability, pasture quality and quantity, climatic conditions and the genetic ability of the lamb to grow.

If one of these factors is weak or missing, growth rate targets are unlikely to be achieved.

*Reference: 400 Plus—A Guide to Improved Lamb Growth for Farmers and Advisors.*



**Figure 1.** Factors affecting lamb growth rate

# Remember the 'Two Qs'—pasture quality and quantity are key

## 42% clover and herbs



## 66% dead matter



**Figure 2.** Low quality (above) and high quality (top)

Understanding the importance of pasture quality and quantity is key to increasing lamb growth rates. Much of a lamb's ability to grow rapidly is determined by the energy level of its feed. Lambs do not perform well on poor quality pasture, regardless of how much they are offered. This is because they have a maximum amount of forage they can eat over a set amount of time (voluntary intake), limiting the amount of energy ingested.

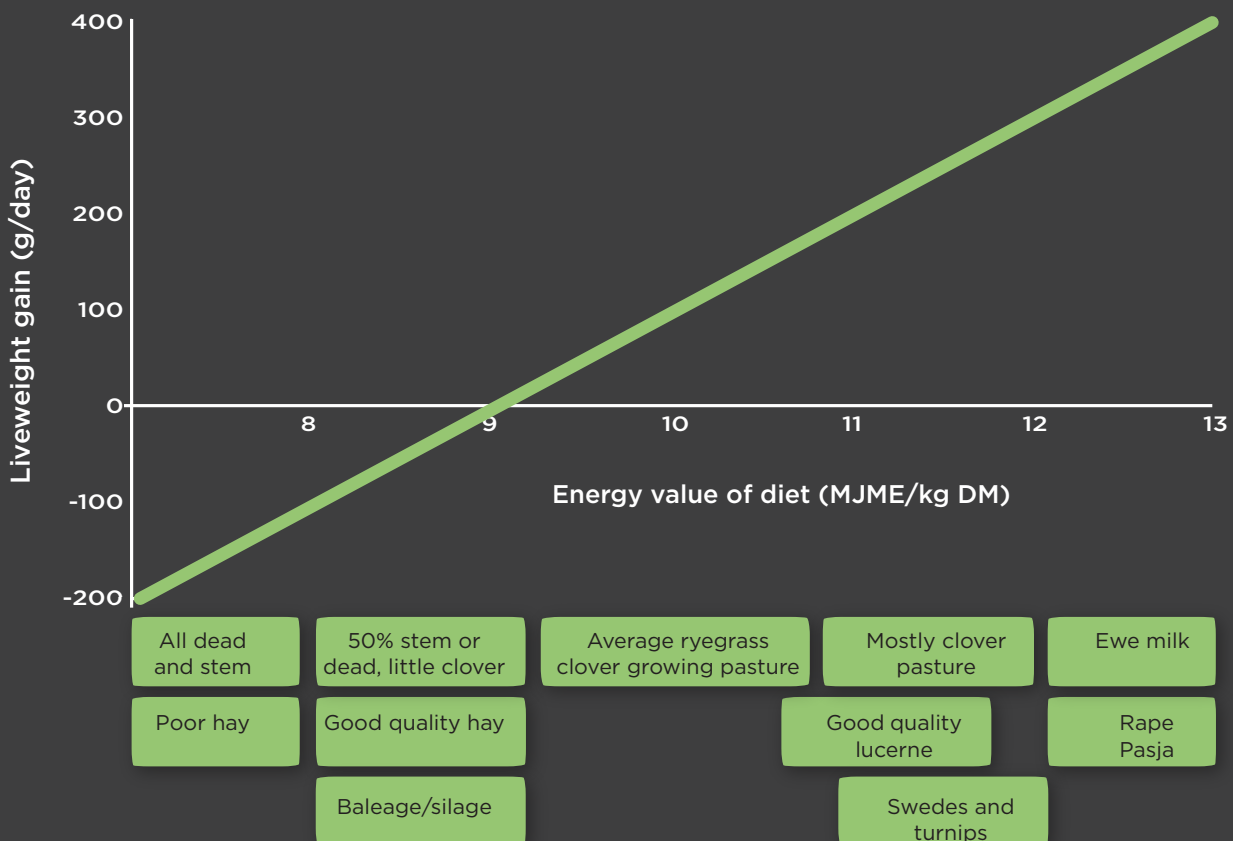
Soil fertility affects pasture growth and species composition. Soil nutrient testing is the best way to determine soil fertility. Increasing soil fertility requires applications of capital fertiliser. For example ash soils, which are common in the North Island, require approximately two tonnes of super phosphate/hectare as an initial application after which maintenance levels are adequate. Lime may also be considered to increase pH to 5.8-6.2; one tonne of lime increases pH by 0.1.

Compare the pastures in figure 2. The 42% clover and herbs content represents a good quality pasture for lamb growth, whereas 66% dead matter shows a lower quality pasture.

Green leaf is the most important factor in live weight gain, so the aim should be to maintain good pasture cover, high green leaf content and when possible, high clover content—see figure 3.

The importance of pasture quality and quantity for growing lambs is covered further on page 11.

*References: Feedsmart 2 'Feed Sheep and Cattle Smarter' Workshop Resource Book; Q-graze Manual—Pasture Quality Principles and Management*



**Figure 3.** Live weight gain of a 30kg lamb and the energy value of the diet  
Source: Stevens 1999



## GROWING GREAT LAMBS— PRE-LAMB DRIVERS

### Genetics

Good genetics play a big part in a lamb's potential to grow. The rams to be used can have a strong bearing on lamb growth—see Central Progeny Test on page 5. Farmers need to fit their ram purchases to their own individual production system. Examples of production systems could include:

- Breeder/store: limited pre-weaning drafts, but primarily marketing store lambs to a finisher
- Breeder/finisher: most lambs finished sold, small number sold store - season dependent
- Finisher: lambs bought from breeders and finished.

Traits important to profitability vary with the type of production system. Breeders need to establish what a finisher is striving to achieve. For example, a finisher selling store lambs may be interested in meat yield eBVs.

Consideration should be given to ram traits most likely to contribute to an individual farm's profitability. For example, a finisher buying store lambs needs to examine the traits of the sire and how they may affect profitability through the progeny.

### Maternal line

The genetics of the breeding ewe is dictated by the objectives of the individual farmer. The ewe should not only be well suited to handle the local environment but also capable of meeting the objectives of the farm. Maternal lines vary considerably and the emergence of the composite ewe has largely been driven by a desire for higher lambing percentages coupled with improved lamb growth rates, the two key drivers to profitability on a sheep breeding property.

### Terminal sires and crossbreeding

Terminal lamb sires in particular will generally produce a faster growing, earlier maturing lamb than maternal or dual purpose breeds. Some terminal sires may also produce early, quick maturing lambs, while other rams produce fast growing lambs that achieve heavy carcass weights without becoming over fat.

## Late pregnancy ewe nutrition and its impact on lamb weaning weights

Ewe feed requirements increase in the latter stages of pregnancy and even more so during lactation. Multiple-bearing ewes need increased feed as lambing approaches to prevent them losing condition.

Protein supply via a ewe's milk is the crucial element in providing a good start for lamb growth. Ensuring good ewe nutrition to aid ewe milking is critical, particularly in late pregnancy and early lactation. Lambs eat more grass as they age, and twins in particular have to start eating pasture sooner than singles.

Lambs born to well-fed ewes in late pregnancy have more energy stored as fat reserves and are better able to survive times of reduced feed, such as during windy, wet conditions or extreme weather. They also maintain their suckling drive longer than those whose mothers were poorly fed.

Ewe lambs born to ewes well fed during pregnancy have better lifetime reproductive performance than those from poorly fed mothers.

Excessive under nutrition before lambing can lead to:

- Sub-optimum levels of colostrum production
- Delayed milk let down
- Lower peak and total milk production
- Low lamb birth weights
- Poorly-developed maternal instinct
- Impaired lamb bonding behaviour
- Impaired thermoregulatory capability of lambs
- Metabolic diseases in ewes.

All these can lead to **reduced lamb survival and lower lamb weaning weights**

Try to feed multiples at an appropriate feeding level above maintenance in the last 5 weeks of pregnancy in relation to number of lambs being carried (put this date in your diary). It's recommended rotations are kept going as long as possible, but reducing mob size and speeding up the rotations closer to lambing is an available option to reduce grazing pressure.

Lamb carcass weight production advantages from terminal sires have been estimated at around 30% with the use of sires such as Dorset and Suffolk (Clarke & Meyer, 1982). Much of the improvement comes from hybrid vigour (heterosis). Lamb production increases are greater when the terminal sire has a superior growth rate to the maternal breed (Parratt & Young, 1985). Expected gains due to hybrid vigour are in growth-related traits including birth weight, weaning weight and post-weaning growth rate, as well as lamb survival. Hybrid vigour is an important factor; it should be used as much as possible.

Many farms use a combination of dual purpose (maternal) rams and terminal sire rams. The terminal sire rams are often used over early-mated mobs and the 'B Flock'. The higher a farm's lambing percentage, the more ewes can go to a terminal sire and make use of the hybrid vigour.

**Central Progeny Test**

Rams vary greatly in the value they pass to their progeny. Progeny tests are used to 'prove' the genetics of a ram by comparing how his progeny perform relative to progeny from other rams under the same conditions. The Beef + Lamb New Zealand Central Progeny Test (CPT) was not set up as a breed comparison, but rather as a ram comparison. It has focused on identifying the best genetics regardless of breed. The CPT booklet contains breeding values and indexes for rams used in the Central Progeny Test.

Farmers can use the CPT results each year to track progress the industry is making and gauge the quality of rams bought.

**Estimated breeding values**

The breeding value is an estimate of the animal's true genetic worth, or the value of a parent's genes, half of which pass on to its offspring.

**How to use an estimated breeding value (eBV):**

If a ram has an eBV of +1.0kg for weaning weight (WWT), we would expect the progeny to be 0.5kg heavier at weaning (the sire provides half of the genes) than the progeny of the average ram in the CPT.

Likewise, if a ram has an eBV of -1.0kg for weaning weight, we would expect his progeny to be 0.5kg lighter than the CPT average. A negative breeding value for weaning weight does not necessarily mean the ram is poor for growth rate. Many dual purpose rams do not have the high growth rates, and therefore negative breeding values are found in the terminal sire breeds because they have been selected for many other traits.

**Breeding Indexes**

A breeding index is simply a way of adding together the breeding values for a number of traits, but with an economic weighting applied to each breeding value so the best economic response is achieved. For example, the CPT Terminal Growth Index is a combination of the weaning weight and carcass weight breeding values.



As can be seen from table 1 there is a \$3.82-\$2.94 range between the top ram and the bottom ram.

The latest Central Progeny Test results can be downloaded from the Beef + Lamb New Zealand website, along with more detailed genetic information in the eSearch tools:

- BreederFinder—breeder contact information
- FlockFinder—ram buyers' tool for finding ram breeding flocks recording desired performance traits
- RamFinder—ram breeders' tool with a powerful search engine allowing users to specify a wide range of criteria when searching for individual animals.

Good genetics play a big part in a lamb's potential to grow. There are gains to be made in lamb growth from choosing highly-ranked terminal sires and dual purpose rams. Buying from flocks with rams highly ranked by SIL increases genetic merit in the flock compared to using rams selected without an accurate assessment of genetic merit.

*Reference: Central Progeny Test Results Book*

**Table 1.** Central Progeny Test Growth Index (\$)

TAG	Flock	Breed	Sites	Progeny	Growth Index (\$)	Rank
296/05	Waikite/Esselmont and Tamlet	Texel	A09	31	3.82	1
231/08	Goldstream	Suffolk	A10	42	3.75	2
241/04	Ohio Poll Dorset	Poll Dorset	A08	34	3.44	3
486/08	Landcorp Kepler	Lamb Supreme	W10	23	3.36	4
447/03	Blackdale Stud	Texel	P06	37	3.32	5
570/06	MegaMeat Glengarry	Poll Dorset	P08	83	3.22	6
17/02	Tyanee	Suffolk	P06	96	3.16	7
4012/99	Bilberry Oaks	Hampshire	W02 W03	50	2.95	8
341/05	Premier Suffolk	Suffolk	W09	37	2.95	9
128/97	Punchbowl	Suffolk	W03	37	2.94	10

## Lambing Date

### Traditional lambing

Lambing date is one of the most important farm management decisions. Ideally lambing should begin at the same time as the annual increase in spring pasture production, but a high proportion of New Zealand farmers lamb too early for their feed supply to achieve high growth rates.

Aligning lambing dates with the spring flush almost invariably results in similar weaning weights and dates as lambing before the flush. Ewes also maintain better condition and, because pasture growth isn't restricted by low leaf area (through over-grazing), pasture growth is optimised through late spring, summer and the rest of the year. Information on the average annual start date for spring pasture growth is usually available on a regional basis from farm consultants.

The practice of lambing before pasture growth matches feed demand usually restricts future pasture production. Pasture growth on these pasture covers is restricted by low leaf area, and is well below its potential. A system only allowed to provide 50-60% of its total pasture production potential grows a 25kg weaned lamb at 100 days. This is an average weight gain of 210g/day. Improved pasture management in spring to better match supply and demand offers potential lamb growth rates of between 300-350g/day. This provides a 100 day weaning weight of 34-37kg.

Contrary to popular opinion, earlier lambing does not necessarily produce heavier lamb weaning weights. McEwan *et al.* (1983) found lamb weaning weights were the same from ewes lambing in early, mid and late September in Southland. Pasture supply was more readily matched by lambing later, and ewe live weight at weaning was improved with later lambing dates. A similar result was found in Canterbury by Geenty (1986). It is better to lamb later and achieve faster growth rates, than lamb early at the expense of optimal lamb growth. Generally later lambing enhances both lamb growth and ewe condition when pastures can be controlled by cattle grazing or mechanical topping.

### Early lambing

Early lambing is sometimes aiming to mismatch pasture supply and demand. This is a bid to control mid to late spring seed head development, as well as enhance clover development—especially in the summer. This often targets higher schedule returns (earlier weaning) rather than faster growth rates. This approach may have some application in North Island hill country areas where pasture control cannot be maintained in late spring (Rattray, 1977; McCall *et al.*, 1986).

Seventy percent of yearly pasture production takes place between September and December. It is only possible for stock to eat two thirds to three quarters of that pasture. On steeper country in particular, hay or silage making may not be an option.

While animal intake should be maximised, this doesn't necessarily mean the whole farm should be grazed.

If weaning has taken place early, a very fast rotation of 20-25 days is recommended. Without a fast rotation, the pre-grazing quantity of pasture may be too high. Ewes cannot consume all the pasture causing its quality to drop.

When residual pastures are 1500-1600 kg DM/ha, cattle can be used to eat the surplus left by the sheep.

If weaning hasn't taken place and ewes and lambs are set-stocked, areas of un-grazed pasture may be found. By having cows and calves in the same paddocks, they will eat the patches rejected by the sheep.

In both cases, some pastures may become uncontrollable. When dry matter levels exceed 2500-2600kg DM/ha, pasture quality drops as dead and seed head material accumulates. In this case it is better to eliminate 2-3 paddocks from the rotation, make hay or silage, or graze them with other classes of stock (e.g. cattle).

Early lambing may also be appropriate in regions where soil moisture can limit pasture production early in the season (e.g. North Canterbury and Hawkes Bay), and there is pressure to move stock off farm before a potential drought. In these areas stocking rates are typically reduced to advance the lambing date. Forages such as lucerne are slowly reducing the need for early lambing in these environments.





## Ewe condition and nutrition

### Ewe Body Condition Score and its impact on lamb weaning weights

Several studies have shown the body condition of ewes at lambing has a big impact on lamb weaning weights.

Ewes with a higher Body Condition Score (BCS):

- Give birth to heavier lambs
- Have increased mothering ability
- Produce more milk
- Wean heavier lambs with higher survival rates.

Lamb survival and growth to weaning are heavily dependent on ewe milk production. A ewe produces 40-50% of total milk yield in the first four weeks after lambing. The ewe uses both dietary metabolisable energy (ME) and her own body reserves for milk production. This normally occurs during early lactation, regardless of the level of feeding, particularly in ewes rearing twins.

A ewe has longer/stronger milk supply if she:

- Lambed in BCS above 2.5
- Loses less than 1 BCS over lambing.

Targeting a ewe BCS of 3 at lambing has a big impact on lamb survival, growth rates and weaning weights.


### Condition scoring at scanning

The period between scanning and approximately five weeks before lambing is the last chance ewes below BCS 3 have the ability to improve condition. It is critical ewes below BCS 3 at scanning are identified and preferentially treated post scanning especially multiple ewes.

Ewes going into the scanning crate below BCS 3 need to be marked and drafted off, especially multiples and low-mouthed older ewes. These ewes should be fed preferentially to improve their poor condition. Ewes with BCS 1.5 and 2 gain most from a lift in condition. Also, consider using a long-acting drench. See the website: [wormwise.co.nz](http://wormwise.co.nz)

If feed is limited, ewes in satisfactory condition (BCS 3 and above) can be fed below-maintenance for short periods from 60 days after mating to 35 days pre-lamb.

Ewes below BCS 3 at scanning need to be drafted off and preferentially fed, especially multiples



In practice, ewes need to have a condition score of 3 or more at tupping. From the end of mating until scanning the target should be full maintenance feed if there is sufficient feed for late winter whilst still meeting the target lambing pasture covers. If there is a small feed deficit, slight underfeeding in early pregnancy can be sustained. From scanning to lambing, intakes should be lifted as shown in table 2 below.



For more information see the [Beef + Lamb New Zealand Ewe Body Condition Scoring handbook](#) and [Ewe Body Condition Scoring video](#)

[www.youtube.com/user/beeflambnz?feature=watch](http://www.youtube.com/user/beeflambnz?feature=watch)

**Table 2.** ME requirements (MJ ME/ewe/day) for a 60kg pregnant ewe to achieve 4kg lamb birth weight

	Weeks before term					
	12	8	6	4	2	Term
Single lamb	10.4	11.1	11.7	12.6	13.8	15.3
Twin lambs	10.7	11.9	13.0	14.6	16.7	19.3



## Animal Health

### Internal parasites

Drench resistance and internal parasites in sheep are common on New Zealand farms, so grazing management should aim to reduce the worm burden. This is difficult on farms with predominantly breeding sheep, but on those with a proportion of cattle or dry sheep, pastures can be prepared for lambs.

It takes two to three weeks for worm eggs shed onto pasture, during summer, to become infective larvae. So the popular practice of spelling or resting pasture from lamb grazing for three to four weeks may in fact coincide with high larvae numbers. Ideally lambs should graze 'safe pastures' or paddocks with low larvae numbers. These include:

- Regrowth after hay or silage conservation
- Summer crops or new pastures
- 'Safe paddocks' only grazed by dry sheep or cattle for the previous three months.

These conditions are not always easy to achieve but the rewards are faster lamb growth, reduced need for drenching, fewer days and reduced risk of drench resistance. Pasture planning should start in early spring.

If lambs must graze contaminated pasture, they should not be forced to graze hard. Over 50% of infective larvae are in the bottom 3cm of the sward, so pastures should be kept above this length.

When lambs are rotationally grazed, they can be followed by cattle or dry sheep to clean up residual pasture. If lambs are set-stocked, their grazing areas should be alternated with paddocks used for dry sheep or cattle at six weekly intervals.

### Trace elements and other factors

Milk and pasture both contain trace elements required to meet growing lamb demands. Understanding this needs information on lamb requirements at various live weights and live weight gains, the amounts of milk and pasture eaten, the amounts of trace elements in both milk and pasture and the fraction of these ingested trace elements which are absorbed (Grace 1983).

Lamb ill-thrift can have many causes. Scouring and failure to thrive can be caused by bacterial stomach infections, mineral deficiencies, diseases like facial eczema (FE) or shortage of feed. Checks for these problems should be made immediately symptoms appear.

Abortive agents can not only impact on lamb and ewe survival, but also have ongoing impacts on lamb growth rates.

## Weather and Geography

### Choosing lambing paddocks

#### *Slope*

Trials show higher lamb survival rates on flat or gently sloping areas than on steep country, because lambs born on slopes slipped off their birth site and were mis-mothered.

Provided visual contact is maintained, single-lambing ewes usually follow the lamb to retrieve it. They sometimes fail if the lamb is stolen by another ewe, slips into a creek or falls through a fence. Twins or triplets are often separated, especially if the first lamb slips from the site while the second or third is born.

Lambs have difficulty on steep slopes during the first four to six hours after birth as they struggle to stand and suckle. After this period they move around without great danger of separation.

Lamb survival is improved on flat or gently sloping paddocks compared to steep hills.

Ewes lamb on any flat area large enough for them to lie down and appear to have little ability to select safe lambing sites. Farmers must therefore do this for the ewes by providing lambing paddocks with few hazards.



When lambs are born on gentle contour, moving them to steeper paddocks within a few days does not cause extra losses. Lambs cope with slopes over 30° once they are mobile and feeding within 4-12 hours of birth.

If suitable lambing areas are limited, the flattest paddocks should be given to ewes with multiples, while single-bearing ewes are put on steeper or colder areas. Alternatively, all lambing can be done in the flatter paddocks, with ewes and their new-born lambs moved to the hills 2-3 days after lambing. This is more easily managed if ewes are marked at mating with different ram crayons, changed weekly, so expected lambing dates are known. Alternatively ewes can be allocated to early, mid or late lambing groups at scanning.

Beware of flat, waterlogged paddocks which can increase deaths from exposure, particularly if shelter is limited.

**Shelter**

Shelter may help avoid deaths from starvation/exposure, although there are many other contributing factors. Shelter requirements vary depending on the timing of lambing and the severity of the weather. High wind increases heat loss from new-born lambs, so providing shelter helps to reduce the effect of the wind and can increase lamb survival.

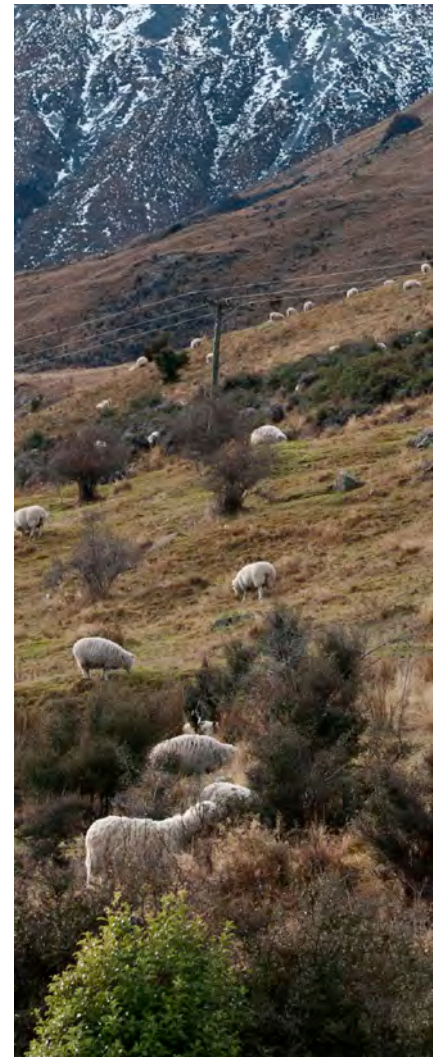
Few farms provide shelter for all lambing ewes, so multiple-bearing ewes, especially those known to carry triplets, and poorly-fed ewes during late pregnancy should be prioritised. Shelter can be provided by:


- Hills or slopes with protection from the prevailing wind
- Trees, as blocks or shelter belts
- Bushy plants and grasses, e.g. phalaris, pampas and tussock.
- Temporary polythene mesh or scrim attached to fence lines.
- Hay bales
- Plastic or wool lamb covers.

**Paddock history**

Some paddocks have a history of good lamb survival for no apparent or obvious reason. If identified, these paddocks should be used for ewes with multiples wherever possible.

*Reference: 400 Plus—A Guide to Improved Lamb Growth for Farmers and Advisors*





Effective shelter helps lamb survival and should be prioritised for multiples

**Stocking rate**

Overall farm stocking rate has a major bearing on the amount of feed available per ewe. Figure 4 illustrates the point at which the optimum relationship between stocking rate and animal performance is achieved and farm profit maximised. A number of production variables, e.g. lambing percentage, can make finding this “sweet spot” difficult.

**Profit**



**Figure 4.** Optimum relationship between stocking rate and per head performance



## GROWING GREAT LAMBS FROM BIRTH TO WEANING

### The Opportunity

A lamb born on 1 September at 4.5kg live weight (LW), growing at 400g/day reaches 37kg LW (18kg Carcass Weight CW) in 81 days on 20 November.

Achieving a growth rate of at least 400g/day can result in several on-farm advantages:

- Lambs sold fat 'off mother' are the most profitable
- Faster growing lambs are more efficient in converting pasture to saleable meat because more feed is able to go into growth than needed for maintenance
- Lamb dressing percentage (carcass weight to live weight) is higher
- Lambs are subject to less parasite challenge. Many faster growing lambs never need to be drenched
- Fewer lambs are subject to endophyte challenge
- A greater proportion of lambs born in August/September are sold into the premium price chilled trade market
- Considerable feed otherwise eaten by lambs is available for cattle, a second lamb crop, an arable crop or to flush ewes
- Faster growing lambs wean earlier reducing ewe feed demand significantly.

### Potential growth rates

The Poukawa Research Farm elite lamb project set out to demonstrate what could be achieved in terms of pre-weaning lamb growth rates in a high performance system. The aim of the project was to investigate lamb growth rates achieved when selected sire and ewe genetics for growth were combined with high quality pasture and good pasture covers throughout lactation.

The level of ewe feeding in this study was above common commercial practice but highlights the potential that exists. Table 3 shows the results for the heaviest single lamb, twins and triplets.

The easiest time to achieve 400g/day growth is from birth to weaning, after which it becomes progressively harder



**Table 3.** Birth weight, live weight at 12 weeks and live weight gain from birth to 12 weeks

	Birth weight (kg)	Weight at 12 weeks (kg)	Live weight gain (g/d) birth to 12 weeks
Single	5.5	51.6	549
Twins	5.0	41.7	453
Triplets	4.4	37.4	396

Muir *et al.* (2003)

### Realistic growth rates

At present, very few farmers achieve pre-weaning lamb growth rates (mob averages) above 300g/day. A 2002 data set from 80 South Canterbury farms recorded a mean live weight gain from birth to weaning of 282g/d (range 195-340g/d). Six North Island properties recorded similar lamb growth rates with single and twin lamb growth rates averaging 273g/d (range 229-311) and 220g/d (range 159-279) respectively, Muir *et al.* (2003).

### Realistic weaning weight scenario

Start of lambing = 1 September

- Mean lambing = 10 September
- Birth weight = 5kg (singles), 4kg (twins)
- Wean = 20 December (100 days).

Using the flock average growth rates, the following weights are achieved at weaning:

- Singles at 350g/day = 40kg
- Twins at 300g/day = 34kg
- Triplets at 240g/day = 28kg.

## Importance of the ‘Two Qs’

### Pasture Quantity

Lower weaning weights have been seen in lambs born to ewes set-stocked four weeks prior to lambing compared with ewes set-stocked one week before lambing. This is because if ewes are set-stocked too early, feed is eaten too fast so body reserves have to be used and are depleted before lactation. There is a fine balance between feeding ewes adequately, particularly multiples, to promote lamb survival and lamb growth in early lactation, and building lambing covers. Feed budgeting is critical to achieving both objectives.

The amount of pasture onto which ewes are set-stocked may also have an impact on lamb growth (Litherland *et al.*, 1999; McCall *et al.*, 1986). Weaning weights have improved by 2kg/lamb for each additional 100 kg/ha of pasture cover at set-stocking in early lambing flocks (Litherland *et al.*, 1999).

Controlled grazing intake in improved pasture cover prior to lambing also showed an advantage for both early and conventional lambing flocks by 3kg and 3.3kg greater weaning weight for singles and twins respectively (McCall *et al.*, 1986).

It is important not to set-stock too early prior to lambing and the spring feed flush because there is a risk of it all being eaten before lambing begins.

From a management point of view this means:

- Ewes lambing earlier should be separated from those lambing three or four weeks later
- Ewes should be split into mating/lambing cycles. This can be done at scanning or achieved by using mating harnesses and crayons, separating ewes into their respective groups as lambing approaches.



The important point is not to set-stock too early before lambing

**Table 4.** Average target live weight gains (grams per day) of crossbred lambs

	Singles	Twins	Triplets	Flock Average
Best performers	400	350	320	350
Quality pastures	375	330	280	330
Harder flats/easy hill	340	280	240	280
Hill country	300	240	200	240



## Pasture Quality

The digestive system of new-born lambs is not sufficiently developed to eat grass, so a ewe's milk supply is critical during the first six weeks. A lamb's stomach changes from monogastric to ruminant over the first three to five weeks of life which enables them to start eating pasture; the length of time varying according to the ewe's milk supply and the quality of feed on offer.

As milk supply reduces the rate of live weight gain is affected by both feed quantity and feed quality. In order to achieve high live weight gain, young lambs need access to adequate quantities of high quality feed, particularly between tailing and weaning.

The importance of high quality feed for lambs during the key management period of birth to weaning cannot be over emphasised. Pasture quality is described by the metabolisable energy (ME) content of dry matter (DM), the digestibility of DM or the green DM as a percentage of the total pasture DM. Animals do not perform well on poor quality pasture, regardless of how much they are offered.

The value of lambs having access to high quality feed during this period is highlighted in the Beef + Lamb New Zealand-funded 'Creep Grazing Trials'. Creep grazing employs a gate through which lambs, but not ewes, can pass to reach fresh high quality feed in an adjoining paddock, while retaining access to their mothers for milk and company. Creep grazing improved lamb weaning weights in 16 out of 18 grazing experiments run throughout New Zealand. Creep grazed lambs were up to 5kg heavier at weaning than lambs not creep grazed.

Understanding the importance of pasture quality and quantity is key in growing lambs rapidly from birth to weaning.



## Effects of grazing management on pasture growth and pasture quality

Grazing management can influence both pasture growth and quality—'grass grows grass'. Pastures grazed too hard have low growth due to reduced leaf area. In contrast, pastures not grazed enough have low growth and poor quality due to high leaf death and dead matter accumulation.

Around 70% of New Zealand's pasture production happens in spring and early summer. The exact timing of this 'spring flush' varies through the country. Managing this feed 'boom' requires careful management and planning. The correct stocking rate and system allows feed supply and demand to be closely matched, minimising surpluses and subsequent build-up of stem and dead material.

Pre-grazing covers of 2400-2500kg DM/ha and residual covers of 1500kg DM/ha yield the optimal balance of production and pasture growth rates.

Matching animal demand to pasture supply allows optimum pasture quality and quantity to be offered to lambs from birth to weaning and post weaning.

Subdivision (temporary and permanent) is an important tool in maintaining pasture control and quality. It enables all aspects of the paddock to be grazed and helps transfer nutrients more evenly.

Subdivision allows more controlled feed allocation to high priority classes of stock and, more importantly, enables farmers to clean up rough pastures with lower priority stock, such as ewes in the summer and breeding cows.

A whole farm approach is needed to ensure high quality feed for lambs from birth to weaning. Poorer quality paddocks (with roughage) should be identified early and 'cleaned up' by low priority classes of stock, such as cows in the autumn/winter. Mob stocking in rotation during winter is an excellent way of producing high quality feed in the spring. For example, high priority classes of stock, such as ewe hoggets and weaner cattle, might lead the rotation, followed by tail end ewes, then the main ewes with cows finishing off what is left. Older trading cattle can also be used in this manner but growth will not be optimal.

Planning how to manage spring pasture growth, both feed deficits and feed surpluses, are of critical importance. Farms need to have 'levers' in the system and flexibility to manage the spring. Examples could include:

- Dropping paddocks out for cropping, or by deferring grazing, helps maintain the pasture quality for the majority of the farm.
- Adjusting seasonal stocking rates, especially in the spring, achieved by buying or selling stock, taking on grazers such as scanned-in lamb ewes, trade stock, or ewes and lambs at foot. Alternatively stock, such as cows and calves, being grazed off the property.
- Increasing lambing percentage and manipulating lambing and weaning dates. This may require a whole-farm approach with farm business implications.
- Feed budgeting to better match feed supply and demand, and manage quality in this key period.

### Specialist forages to improve lamb weaning weights

The performance of multiple-bearing ewes and their lambs on traditional ryegrass-based swards is limited in late pregnancy and lactation. A number of farmers achieve success using alternative herbage, such as chicory, plantain, lucerne and red or white clover. Improved lamb growth rates to weaning, and higher dressing out percentages, have been seen on some of these specialist forages, with more lambs slaughtered at weaning. Ewe weaning weight improvements have also been seen which is important in a summer dry environment. If ewes have a better BCS when their lambs are weaned, they are better able to withstand weight loss during summer, and have less weight to regain before the next tupping.

Table 5 shows the results of a Massey University trial investigating a herb and legume sward mix into ewe milk production and ewe and lamb live weight (LW) gain to weaning. The herb treatment showed greater increases in ewe LW and BCS during lactation, ewe milk yield, lamb LW gain and, by day 66 of lactation, total lamb LW per ewe.

**Table 5.** Production from twin and triplet-bearing ewes and lambs at 66 days

	Herb	Ryegrass/white clover
Ewe live weight (kg)	70.9	66.0
Body condition score	2.8	2.4
Milk at 21 days (ml)	3237	2428
Lamb live weight (kg)	20.7	17.6

Hutton *et al.* (2010)



### When to wean

Biologically, lambs should be weaned when they begin to compete with their mothers for feed and/or when the lamb's growth rate would be similar or faster if weaned. This varies from year to year, but is generally when average pasture height falls below 3cm. In summer safe areas, ewes often compete for quality rather than quantity.

If feed is not limiting, lambs typically wean at about 10-14 weeks of age. At this stage ewe milk production has declined to about 1l/day. This represents around 30% total dietary energy requirements of a single lamb (15% for a twin).

This assumes the lambs are growing rapidly at about 250g/day. If they are not growing this fast, feed is likely to be limiting and the ewe's contribution to the lamb's total energy requirements probably even less.

Economically there are times when advancing weaning can be financially beneficial. When the schedule or store markets are declining, as they typically do prior to Christmas, it may be more economical to wean or skim draft earlier than is dictated by biology alone.

## GROWING GREAT LAMBS POST WEANING

Achieving high lamb growth rates after weaning, without the input of ewes' milk, is a major challenge. It has many advantages but requires an all-encompassing view of management, as well as planning to achieve pre-determined goals.

Table 6 illustrates some of the advantages of growing lambs faster post weaning, including less overall feed being required to achieve target weights, less labour and animal health inputs, the possibility of beating a falling schedule, more profitable trades and more management options.

**Table 6.** Feed conversion efficiency for different lamb growth rates between weaning at 24kg and a target live weight of 34kg\*

	Lamb growth rate (g/day) from 24-34kg			
	100	200	300	400
Feed requirement (kg DM/day)	1.2	1.5	1.9	2.4
Days to target weight (34kg)	100	50	33	25
Feed consumed (kg DM)	120	75	63	60
Conversion efficiency (%) (kg DM/live weight gain x100)	8.3	13.3	15.8	16.6

\* Target live weights in 2014 are closer to 40kg live weight. Source: Geenty, 2000

### Lamb growth rates post weaning

Do you know your average lamb growth rate post weaning? If so, how does your lamb growth measure up?

1. Below 50g/day—poor growth, considerable improvement possible
2. 50-100g/day—average, plenty of improvement possible
3. 100-200g/day—above average, still room for improvement
4. 200-400g/day—very good
5. Above 400g/day—exceptional.

If your lamb growth rate falls below 100g/day there are many ways of improving it at minimal cost, as outlined in this resource book. Some improvements may require investment in new pastures/forages. If this is done correctly, the investment can produce a good return.

Reference: *400 Plus—A Guide to Improved Lamb Growth for Farmers and Advisors*

### Management of lambs post weaning

If you are a breeder/finisher consider the following:

- How much value are you adding to your trade lambs post weaning?
- Is your property set up for finishing these lambs?
- What is the impact on your capital stock, including hoggets?
- What is the impact of these decisions on next year's production?
- What is the impact of finishing lambs on your pre-winter feed covers?

The major decision for growing great lambs post weaning is whether the property is able to grow lambs through to a target slaughter weight without compromising other parts of the farm system. It is also dictated by the season and other stock policies on the farm.

Apart from specialist finishing farms, many farms have environmental constraints such as a summer dry environment or physical constraints such as topography, fertility, and grass species. This may mean it is more profitable to grow and sell a larger proportion of store lambs, rather than trying to finish these lambs to higher weights.

A breeding farm can still be profitable selling a proportion of store lambs. Many farmers realise better production from their breeding ewes by shifting the focus in autumn back to the breeding ewes and hoggets. There are also breeding/finishing farms that do both very well.



The Pasture Renewal Charitable Trust website details useful tools for analysing the direct costs and benefits of pasture renewal. [pasturerenewal.org.nz](http://pasturerenewal.org.nz)



## Factors influencing lamb growth post weaning

There are many factors influencing lamb growth rates post weaning:

- Feed quantity and quality
- Animal health status of the weaned lamb
- Parasites—worms
- Clean water
- Animal husbandry and grazing systems
- Genetics
- Heat stress
- Fungal toxins.

## Feed quantity and quality—the ‘Two Qs’

As discussed earlier both feed quantity and quality have a big impact on lamb live weight gain (LWG). In order to achieve high live weight gains, lambs need access to adequate quantities of high quality feed. Unless lambs are grazed on feed of adequate quantities LWG will be below potential. Even where there is adequate quantity, animals can't increase intake to compensate for decreasing quality.

Lambs will select a higher quality diet (11+ MJME/kg DM) when grazing. During grazing, the highest quality components are eaten first so the quality declines over time. Fast growing lambs will often only use the top third of pasture. This is why shifting high priority stock such as growing lambs sooner rather than later is beneficial for growth rates.

## In summary

A large quantity of quality feed needs to be on offer.

Lambs will use less than a third of this feed, selecting the top energy components (11+ MJME/kg DM) of the pasture.

If forced to eat more than the top third of pasture, lambs will be eating stems and leaf sheath—both of which have lower energy levels.

If forced beyond this, lambs will also be eating some dead material which impacts growth rates.



## Pasture quality

Feed quality is influenced by a number of factors including concentrations of energy, protein, minerals and trace elements, and loadings of fungal toxins and internal parasite larvae. The major quality limitation to the growth of lambs is the nutritive value of the herbage eaten. The nutritive value (NV) of a feed relates to the proportion of nutrients digested (digestibility) and the efficiency with which these digested nutrients are absorbed and used within the animal's tissues (Ulyatt *et al.*, 1976).

Pastures typically contain about 15-30% protein, adequate for most grazing stock. The most common limiting component of herbage NV is metabolisable energy (ME) concentration, expressed as megajoules per kilogram dry matter (MJ ME/kg DM). Metabolisable energy is the amount of energy in ingested feed left for productive purposes after losses in faeces (indigestible material), urine and gases from the rumen. Pasture ME ranges from 8-12MJ ME/kg DM, depending on its botanical (grass or clover) and morphological (leaf, stem or dead) composition, its age and the time of year.

The importance of green, leafy pastures on feed quality and intake cannot be over emphasised, as illustrated in figure 5.

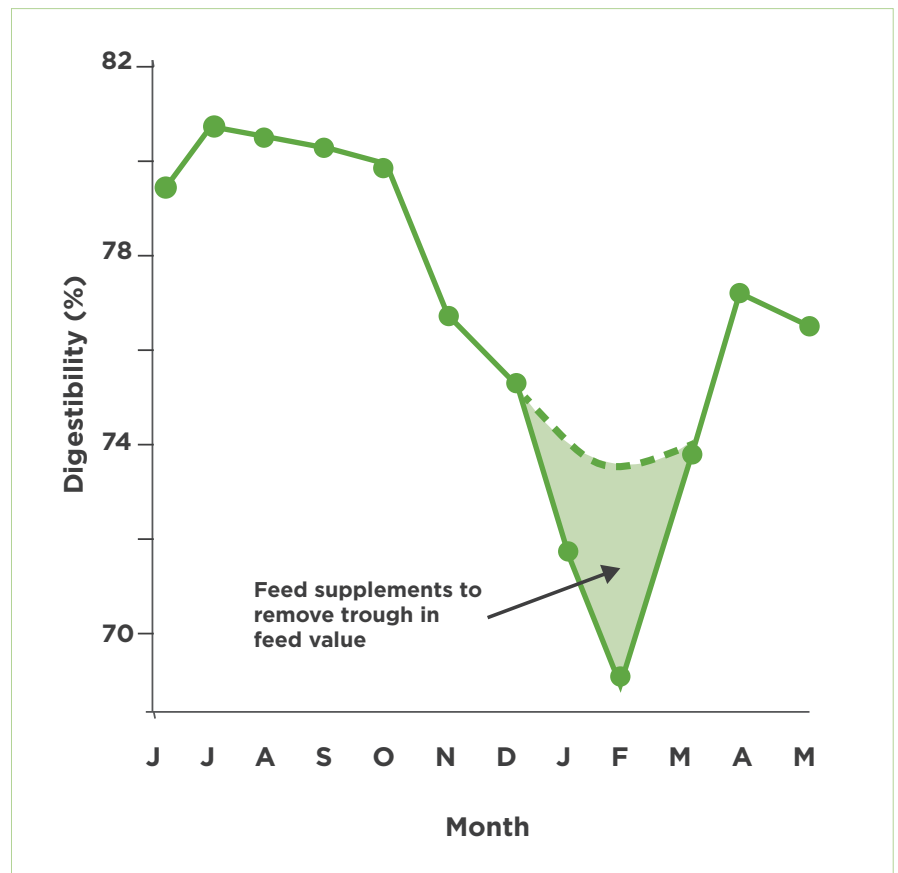


Figure 5. Effect of season on pasture digestibility in dry areas

Source: Rattray, 1987

Feed quantity for fast growing lambs:

- 4-5% live weight
- 1.5kg DM/day for a 30kg lamb (a 30kg lamb takes 18 MJME to grow at 250g/d)
- Residual 1400-1500kg DM/ha on pasture (3-4cm in spring)
- Utilisation 70% on summer green feeds e.g. rape or chicory.

NB. Fast growing lambs use less than 1/3 of pasture.

In reality ryegrass pastures are unlikely to sustain growth rates of over 250g/day post weaning with significantly lower rates in areas unirrigated or not summer safe. Alternative species need to be sought in these areas used for lamb finishing. Species which support high lamb growth rates post weaning include legumes such as lucerne, clovers, herbs such as chicory, brassicas such as rape and summer forage brassica.



### Rate of digestion

Feed digested quickly moves through the lamb's gut faster, giving the animal opportunity to eat more and ensure greater growth.

Pasture species achieving this fall into two groups:

- Low NDF (neutral detergent fibre) concentration (low cell wall) pasture as they have high digestibility and a high energy value. Lambs grazing these grasses in spring grow faster than lambs fed the same grass in summer
- Legumes and herbs as they break up more readily moving through the gut faster, hence allowing more feed to be eaten if/when required.

These factors contribute to overall pasture digestibility, which itself varies throughout the year.

Figure 5 illustrates seasonal pasture digestibility.

### Fungal Toxins

#### *Ryegrass staggers*

This condition is caused by a ryegrass endophyte fungus. A chemical toxin produced by the endophyte gives the grass protection against insect attack but causes staggers in sheep and cattle.

Affected stock is best handled as little as possible and preferably set-stocked. The endophyte is present in all parts of the grass plant so rapid rotations to avoid hard grazing are of no benefit.

Plant breeding has produced ryegrasses with novel endophyte affording some protection to the plant but with the adverse impact of causing staggers in sheep and cattle. It may be worth considering the use of these cultivars in areas requiring endophyte.

#### *Facial eczema (FE)*

Outbreaks of FE typically occur in autumn following warm humid weather. It happens when sheep eat the toxic spores of a fungus which grows on dead plant material. Animal performance falls long before visual animal symptoms are seen. Zinc dosing is effective but preventive grazing management is cheaper and easier. This should be done in conjunction with pasture spore counts.

The FE fungus survives best in dead material from high-producing species like ryegrass and does very poorly in low quality, rank pasture. The most 'at risk' pastures are those where leafy ryegrass has been hit by dry conditions giving wispy dead leaf.

The first step in FE-prone areas is to identify vulnerable areas on the farm. Spore counts from known vulnerable areas can be used as an indicator of FE build up. Minimising dead material build up in pastures reduces the risk of FE outbreaks; with cooler, south-facing slopes generally having fewer spores than warmer north facing areas. If high spore counts

occur, safe areas should be grazed first. Planned build-up of feed in these paddocks in summer makes this possible.

If high risk pastures need to be used they should be grazed lightly so stock don't eat base litter in the bottom 1-2cm of pastures. If FE occurs regularly, stock policies should be implemented in summer-autumn to reduce numbers in an FE season and avoid a shortage of 'safe' feed.

Animal breeding has produced lines of stock more resilient to FE. Consider breeding resilience/tolerance into your flock if in an area prone to FE.

#### *Other fungal diseases*

There are various fungal toxins which depress feed intake and production including the fusarium fungus toxin, zearalenone. This fungus also lives on dead material in the pasture and the toxin depresses ovulation rates in ewes in the autumn.

High risk conditions are difficult to predict using spore counts or climate patterns, but toxin levels can be measured in grass and urine samples. Zinc dosing is ineffective, so grazing management is the only treatment. It is best to avoid grazing dead material with ewes approaching mating. A fast rotation before and during mating helps avoid zearalenone.

#### **Clean water**

Like all animals, ready access to clean water is imperative. As a guide, sheep require 4 litres per head per day and lambs require 1 litre per head per day.



## Animal health and management plan example

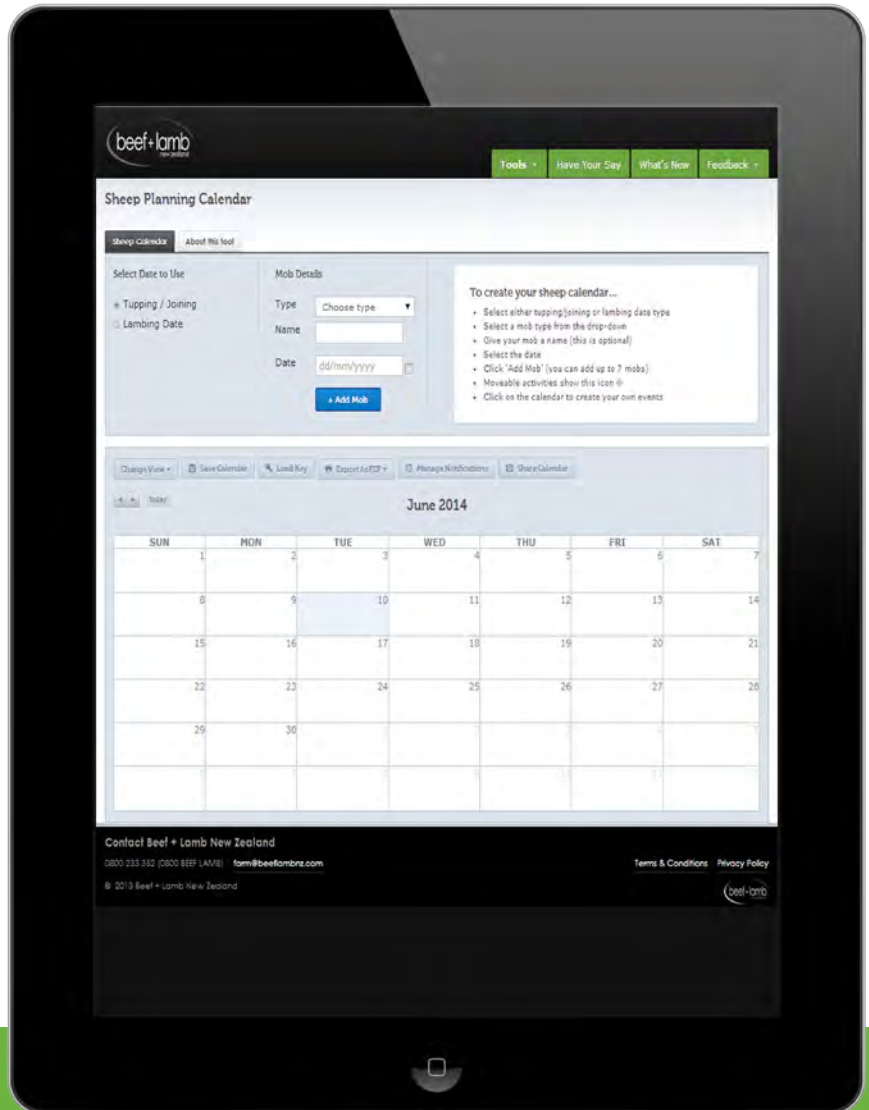
The Beef + Lamb New Zealand website contains the online sheep calendar tool. This can be used to plan sheep-related animal health activities customised to an individual farm. It is a handy planning tool, showing all the key sheep production activities in an easy-to-use online calendar. You can store information on up to seven different mobs, making management in busy times easier.

### To use the tool

- Decide whether your target is lambing or tupping
- Choose a mob type: mixed-age ewes, two-tooths or hoggets
- Choose a target date.

The calendar automatically populates with all activities for that mob, from pre-lambing through to lambing, e.g. when to start scanning or the final date to administer a Salmonella vaccine booster.

Beef + Lamb New Zealand designed the calendar to be flexible. You can move some activities around to suit your own farm practice and schedule.



[www.beeflambnz.com](http://www.beeflambnz.com)  
[portal.beeflambnz.com/tools/sheep-calendar](http://portal.beeflambnz.com/tools/sheep-calendar)

## THE FARM SYSTEM

Improvement in lambing percentage inevitably means proportionately more multiple lambs, and therefore changes to the farm system are needed. For example, very different management and production practices are required to ensure stock are finished by target date when farming at 150% lambing compared with 110%.

The main aspects of management and production which need reviewing include:

- Planning and prioritising of activities for a new system
- Mating and lambing date
- Number of ewes carried through the winter
- Lamb selling and breeding replacement policies
- Sheep to cattle ratio
- Feed planning—particularly winter feed as increases in winter crop may be necessary
- Breeding policy—balance of flock to maternal and terminal sires
- Pasture production and fertiliser needs.

For example, with 30% more ewes carrying twins, good ewe body condition and adequate feed at lambing become more important, otherwise lamb mortality increases markedly and total lambs weaned do not increase proportionally. This means either more feed is required through late winter and early spring in particular, or ewe numbers have to be decreased. These decreases in numbers are often over-estimated, particularly where the winter feed budget can be bolstered and lambing covers lifted. Ultimately, ewe numbers should be determined by what can be run through spring effectively.

Having a greater proportion of lambs during the spring-summer period means lamb selling and drafting may need to be earlier than previously. This ensures enough feed for good ewe weights at the next mating and adequate growth for replacement ewe lambs.

In addition to stock policy decisions, other components of the system need consideration to support a higher lambing percentage. These include fertiliser application and pasture varieties for better feed production, provision of stock shelter, adequate sub-division for effective feed planning and allocation, and reviewing the lambing date.

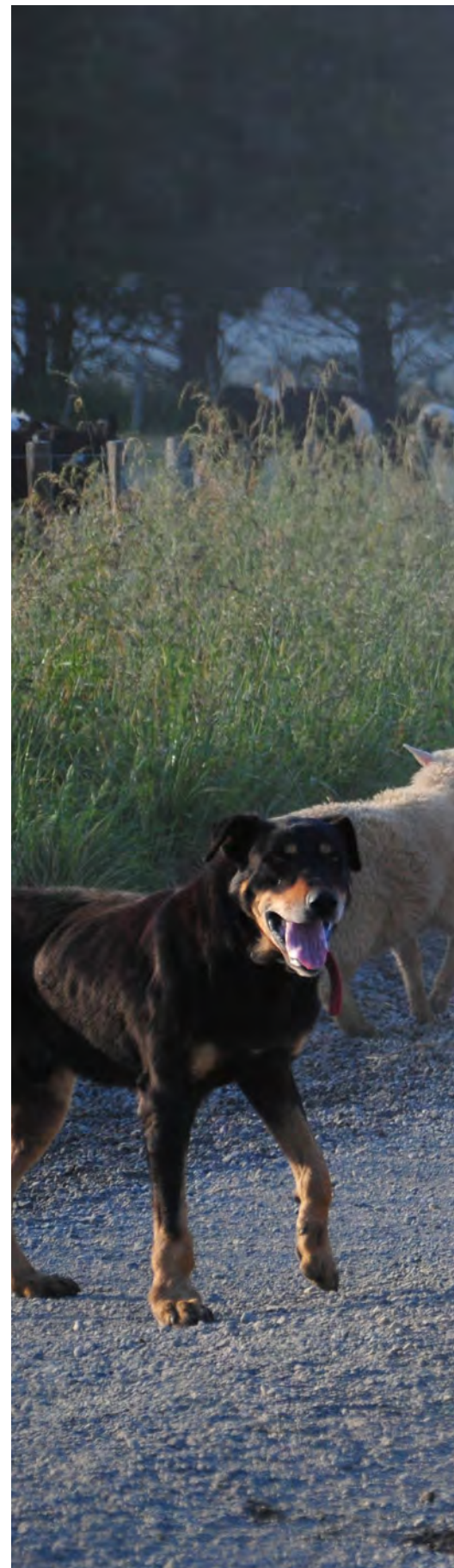
### Monitoring

A critical part of effective planning and management for higher lambing percentage is monitoring to provide 'quality information for quality decisions'. For example, a significant improvement in lambing percentage may simply come from vaccinating against contagious abortion (toxoplasmosis, campylobacter and others) if this is known to be a spasmodic or regular problem.

Key aspects to monitor include the following:

- Pasture cover for feed levels
- Ewe mating and weaning weight, and body condition score
- Pregnancy scanning to determine preferential management
- Growth rates of lambs to inform drafting and replacement decisions
- Genetic merit of rams
- Animal health status and health plan.

Monitoring should not be perceived as a cost but as a productive investment



At higher lambing percentages, planning and management need to be finely tuned to match feed supply and animal demand accurately. Changes to the farm system could include increased winter feed, less ewes wintered, later lambing, and earlier drafting of lambs



## CONCLUSION

It should be noted there is no set recipe for the best farm system. The knowledge, attitude and skills of the farmer, the production and profit goals, as well as aspects unique to the farm, are all important when developing the best system for an individual farm.

The realisation of lambing potential requires consideration of the many events and activities throughout the farming year from lamb weaning right through until the following lambing.

## RESOURCES

The following resources are referenced throughout this book

- Better Ram Buying Decisions
- Ram Buyers Guide
- Buying Rams to Improve Flock Profit
- Hogget Performance—Unlocking the Potential
- 400 Plus—A Guide to Improved Lamb Growth for Farmers and Advisors
- Feedsmart 2 'Feed Sheep and Cattle Smarter' Workshop Resource Book
- Q-graze Manual—Pasture Quality Principles and Management
- Central Progeny Test Results Book
- Ewe Body Condition Scoring Handbook.

For further information or to access these resources, freephone Beef + Lamb New Zealand on 0800 BEEFLAMB (0800 233 352) or email [enquiries@beeflambnz.com](mailto:enquiries@beeflambnz.com) or visit [www.beeflambnz.com](http://www.beeflambnz.com).



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