



Sheep and Lamb Guide





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Introduction

This guide covers both sheep nutrition and lamb rearing, and is intended as an all in one nutrition guide for both lifestyle and commercial sheep farmers alike. NRM has a wide range of sheep and lamb solutions for all stages of life, from lamb to ewe, that can fit into any sheep farming system to help boost animal health and productivity.



Sheep – many breeds with diverse needs

Sheep are productive and truly versatile farm animals. The breed of sheep you keep and the level of performance you desire can have a large effect on the nutritional requirements of your flock. Anyone contemplating keeping sheep or changing their flock has the advantage of tremendous genetic diversity within the sheep breeds available in New Zealand.

Sheep breeds have been developed all around the world to meet specific requirements including hardiness against extremes of weather and feed supply, prolificacy, ease of lambing, milk production for their offspring or increasingly as dairy ewes, meat production, disease resistance, type and yield of wool produced or ability to self-shed. In the early 2000s commercial sheep farmers adopted composite breeds which contributed to improved lambing performance and focused attention on management and survival of multiple births. Fortunes were once made on the value of the wool clip but after some years of relatively low wool value and less people wanting to become shearers, easy-care self-shedding breeds have become more attractive to both commercial and lifestyle farmers.

For some, the cuteness of the Valais Blacknose may be justification enough to keep them rather than any other breeds. This guide has been produced to help people understand the needs of their sheep and increase awareness of the supplementary feed options available.

Sheep numbers at 30th June 2017

17.7 million breeding ewes

9.7 million ewe hoggets, dry ewes, wethers and rams

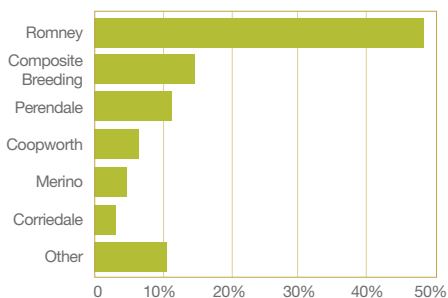
27.4 million sheep wintered

-28.8% on 2007

-0.8% on 2016



Sheep breeds 2015-16



Source: Beef + Lamb New Zealand Economic Service, Sheep and Beef farm survey



Sheep nutrition – the insider's guide

Sheep are classed as ruminant animals. They are able to get nutritive value out of high fibre feeds such as grass that is not available to animals with a single, simple stomach like ours.

This is possible due to their highly specialised gastrointestinal system and their symbiotic relationship with microorganisms, which allows them to break down cellulose and generate nutrients that support life and production.

Sheep have four stomach compartments and 'chew the cud' as cattle do. Although sheep are classed as grazing animals like cattle, they do have different grazing behaviours and due to their split upper lip and small mouth relative to body size, they can graze closer to the base of the pasture sward and can handle shorter pastures better than cattle.

Sheep have four stomach compartments

Rumen

This is the largest and most important stomach compartment. The rumen is where the feeds that are consumed are fermented by rumen microorganisms. Absorption of nutrients occurs here – the rumen wall is covered in finger-like projections called villi. The huge surface area increases the absorption of nutrients for the sheep and helps to keep the rumen within an adequate pH range so that the rumen microorganisms work at breaking down the feed they eat as optimally as possible.

Reticulum

The reticulum is important for feed particle size sorting and propulsion of long feed particles into the mouth for rumination. Sheep 'chew the cud' when they can rather than chew the grass a lot before swallowing which is a behaviour they have developed due to their natural place in the animal kingdom as prey animals. The rumen and reticulum are sometimes referred to as the reticulorumen, as rumen digesta is constantly moving between them.

If you require further information or advice, please feel free to visit www.nrm.co.nz for access to our online nutritionists.

Omasum

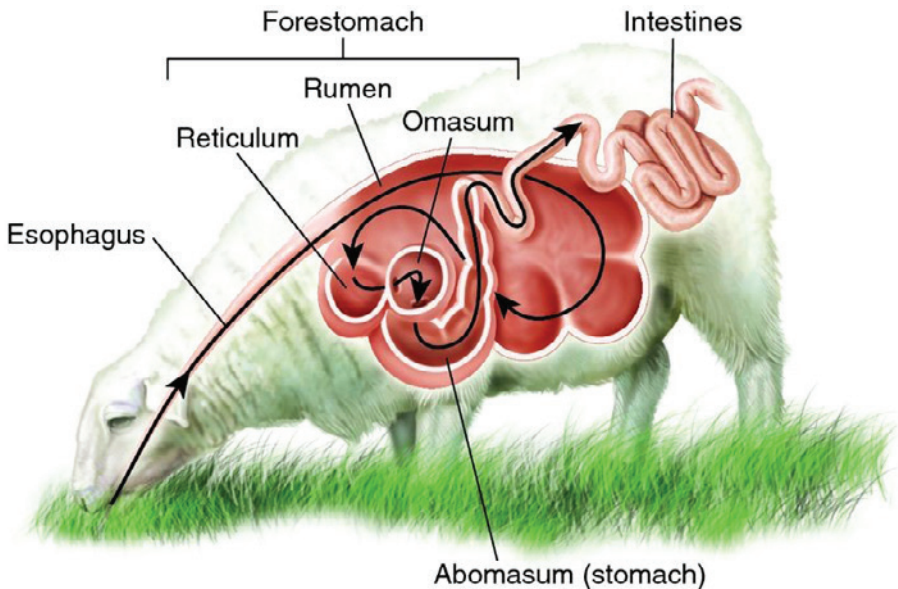
Water and electrolytes are absorbed here through sheets that resemble the leaves of a book and is sometimes called The Butcher's Bible.

Abomasum

This is often referred to as the 'true' stomach as it is similar in functionality to the stomach of animals with only one stomach. The abomasum has a lower pH than the rumen and material in the

abomasum cannot be regurgitated. Like the human stomach, the abomasum has a powerful sterilisation effect on the material leaving the omasum, which is high in bacteria.

The rumen of the newborn lamb is small and undeveloped. Grain based lamb feed can help stimulate rumen development and the early transition to a forage based diet (see rumen development section page 34).





**Supplementary
feed**

How can supplementary feed fit into the diet of sheep?

For sheep farming to be profitable, less worrying or simply more personally satisfying it helps to understand your current system and what aspects you would like to improve.

Supplementary feeding with the right product at the right time is more likely to deliver success if you review your current system, identify what you would like to improve and know that options are available if unexpected challenges occur.

Perhaps you want more lambs reared, earlier lambs, bigger, healthier lambs or just options when the weather goes against you. From filling a simple feed pinch to supporting high genetic merit stock to help sheep express their genetic potential, the NRM range is worth understanding and considering.

Feeding supplements to sheep can be a great choice whether you are on a lifestyle block or a commercial farm. The NRM range of sheep feeds offers choice to sheep farmers with a range that has been extended to reflect the different needs

of sheep according to their stage of life, pasture supply and level of production.

Whether feeding Sheep Nuts every day on a lifestyle block to get some minerals and vitamins into them and train them to come to a rattling bucket, or feeding at critical times during the season to increase productivity – NRM has a feed that suits.

Sheep are good converters of New Zealand pasture but supplementary feed offers a buffer against unpredictable weather and another level of nutrition, which can be targeted at those that need it the most.

It can be useful to weigh stock destined for the works but the ability to body condition score sheep is a worthwhile skill when determining the nutritional needs of a flock. The mature weight of ewes varies even within a breed and the degree of fat cover gives a more reliable indication of the individual or flock's need rather than weight.

For heavily fleeced sheep it is important to feel the fat cover as a thick fleece may hide a thin body. Sheep perform best on short, leafy pasture. Pasture length can be used in conjunction with body condition score to determine if supplementary feeding is likely to be worthwhile.

How can supplementary feed fit into the diet of sheep?

The below is a useful table sourced from Beef and Lamb New Zealand which can be helpful when reviewing what pasture you have available and whether it reaches the requirement of stock on hand.

Minimum pasture length and dry matter intake for sheep throughout the year				
	Pasture length (cm)	Pasture DM	Feed intake (kg/DM/day)	Production Level
Mid-pregnancy	1-2	400-500	1.0	Maintenance
6 weeks pre-lamb	2-3	600-800	1.3	60-80g/day
Ewes and lambs	4-5	1,400-1,600	1.8	180-200g/day (lambs)
Summer	1-2	900-1,000	1.0	Maintenance
Mating	2-3	1,200-1,1400	1.4	120-150g/day

Taken from Beef and Lamb New Zealand — pasture length is the primary way to control body condition score.



Key times supplementary feed may be useful for sheep

During a feed pinch

A feed pinch can occur at any time in the season, however is most likely to occur:

- During a hard winter when pasture cover gets lost to snow and frost.
- During a late spring when pasture growth is delayed.
- During the summer, when a lack of water and high ambient temperatures limit pasture growth.
- When you have had a good lambing and find you have more mouths to feed.
- Sometimes we just get carried away and build up flocks faster than our capacity to produce grass.
- Sometimes pasture renewal may not go as planned and may need to be grazed lightly to improve establishment.
- Pests such as grass grub can damage pastures and hinder growth.

Often conserved forages are the first thing pastoral farmers turn to when faced with a pasture deficit. To minimise harvesting costs, conserved forages like baleage and hay are normally cut at a later stage of maturity than they would normally be

grazed. Sheep have evolved to select the most nutritious parts of the grazing available to them and do not cope so well with the more mature grasses cattle and horses favour.

Conserved forages present sheep a double whammy – the higher fibre level it typically contains reduces dry matter intake and also reduces digestibility so they eat less and get less energy from each mouthful. At times, a maintenance diet may be appropriate for some sheep but if a higher level of nutrition is required compound feed offers the potential to deliver nutrient dense, digestible feed in a convenient package. Ruminants need long fibre to ruminate on, so forages should always comprise the majority of their diet.

If the body condition of sheep is slipping, or if some weight gain is required, NRM Sheep Nuts (page 16) or NRM MultiFeed Nuts (page 17) are useful, high grain based feeds, which are typically fed at up to 150g/head/day. If a drought really takes hold and a high level of supplementary feed is required to overcome a feed pinch, NRM Summer Dry Nuts (page 21) can be fed at higher rates due to its higher fibre content, and also delivers more protein to help balance more mature conserved forages, which may have to be fed alongside limited grazing. As a 10mm nut, both products are well suited to being fed on the ground with minimal waste.

How can supplementary feed fit into the diet of sheep?

Over the tupping/mating period

The average lambing percentage in New Zealand was 129% for the 2018-2019 season and each year it seems to increase due to improved nutrition and management of ewes. Flushing ewes – raising their level of nutrition before and through mating – has long been recognised as a way of stimulating fertility, both in terms of the number of eggs released and conception rates. NRM Sheep Pre-Tup Nuts (page 17) are – as the name suggests – designed for feeding to ewes and rams 4 to 6 weeks before and during tupping (mating). The response to flushing is greater for lighter ewes so it may be worthwhile preferentially feeding younger ewes that are underweight, ewes that have lost condition feeding triplets or later lambing ewes that need some encouragement to hold to service earlier for next spring. If the weather or irrigation obliges by providing good quality pasture before mating, they may not be necessary but if pasture quality or supply is sub-optimal, or if ewes need an extra lift after a hard period, they are well worth considering.

As catalysts that speed up reactions, trace minerals are involved in many bodily processes and hormones. NRM Sheep Pre-Tup Nuts contain elevated trace mineral and vitamin levels to help minimise the risk of deficiencies that might impact on health and fertility at this important time. Implantation takes place 14-28 days after mating, so it is important to also avoid stress after the tupping

period to maximise embryo survival. NRM Pre-Tup Nuts are also good for rams as well provided they are not carrying too much condition and are worthwhile if rams eat nuts whilst with the ewes to keep up their energy levels during a busy time.

In late pregnancy for single and twin bearing ewes

As lambing draws closer, energy demand from the developing fetuses increases just as their size restricts rumen volume and dry matter intake at a time of year that pasture quality could be falling, so it can be a tough time for ewes. About 70% of fetal growth occurs in the last third of pregnancy, greatly increasing ewe energy requirements. NRM Sheep Nuts (page 16) are a useful supplement during this time to support ewes and avoid pregnancy toxæmia (also known as sleepy sickness) which can affect ewes in late pregnancy due to the growing fetuses. Improved nutrition pre-lambing can also help the survivability of lambs by improving fat stores, and improve the quality of the colostrum and the milkiness of ewes. It can be useful to introduce or ramp up the feeding rate of Sheep Nuts approximately a month before lambing.

In late pregnancy for triplet bearing ewes

Until recently many people considered triplets as an unwanted outcome of prolific breeds and crosses. As demand has grown even for surplus lambs for

hand-rearing the economic bonus of extra live lambs is being more fully appreciated. Adverse weather events can devastate new-born lamb survival overnight so if you can increase survival rates when the weather is favourable it can help to lift the season's lamb tally.

For triplet-bearing ewes the risk of pregnancy toxemia is even higher with 3 growing fetuses. For this reason, there is a specialist product available designed just for triplet-bearing ewes in late pregnancy – NRM Sheep Triplet Nuts (page 18). The Sheep Triplet Nuts are higher in protein, energy and micro/macro nutrients compared to the standard NRM Sheep Nuts, which makes them a targeted solution just for triplet bearing ewes. It is not recommended to feed the Triplet Nuts

to single and twin bearing ewes, so the product is best for flocks that have been scanned and farmers have a separate triplet bearing flock. They are also a good option after lambing for all ewes with lambs to help support milk production – especially if grass growth is not keeping up with the growing needs of the flock.

Note: *Feeding ewes after lambing is difficult with large flocks because of mis-mothering. When ewes see feed being put in troughs they can forget they have just lambed and leave their newborn to perish. Such problems are less likely with small flocks and now there are restricted access feeders available, which provide the ewes with access to feed 24/7 removing the risk of ewes rushing for new feed.*





NRM nuts

Using sheep nuts

Nuts can be a great option for supplementary feeding sheep.

All NRM nuts are 10mm in diameter, which means less wastage when fed on the ground, especially compared to other supplementary feeding options such as silage. Being grain-based, they are energy dense and where appropriate have added protein to meet the needs of young stock and in-lamb and lactating ewes. They also all have added vitamins and minerals so are a good way to deliver essential nutrients into sheep to keep them as healthy as possible. They are also easy to feed out and convenient.

Tips for feeding out nuts to a flock

- Always feed in a line, or troughs, long enough so all animals can come and eat the nuts at once without competition. If competition is allowed it will mean that dominant animals over-consume the nuts and others may miss out.
- Stick to feeding recommendations when it comes to introducing the nuts into the diet and feeding rates. Too much too fast of a grain-based feed can cause acidosis (a health issue caused by gorging on high quality feeds), however this can be easily avoided by sticking to feeding recommendations.
- There are many different ways to feed out



the nuts, from the simplicity of opening a bag and pouring it in a line by hand, to using a tow behind nut dispenser and many ways in-between (Kiwi ingenuity at its best is using a shoot on the back of a ute when feeding a large flock).

- Be patient with animals you are introducing nuts to if they have never eaten them before – it can take a few feeds to get them to try the nuts and get used to them. It's a learning process that may take time and some perseverance.
- Nuts are a great way to move sheep around without a sheep dog – once used to the taste sheep will come running for nuts even when pasture supply is good.
- Always ensure that animals have access to long fibre in the diet (eg pasture and/or hay).
- Always ensure that animals have access to water.

NRM Sheep Nuts

NRM Sheep Nuts are designed to supplement pasture, particularly in times of low pasture growth and/or poor pasture quality or where nutrient demands are high.

Key benefits and features

- Quality ingredients in a 10mm nut to ensure optimum utilisation and reduced wastage.
- High levels of digestible energy and metabolisable energy (ME) compared with other supplements such as forages to help sustain sheep during periods of feed stress.
- Highly digestible ingredients for late pregnancy when feed intake is limited.
- Molasses for increased palatability.
- A wide range of essential vitamins, minerals and trace elements for flock health and production. This includes vitamins A, D and E, as well as trace elements such as zinc, selenium, iodine, cobalt and manganese.
- Formulated to avoid excess copper content which can be deleterious to sheep.

The NRM quality assurance programme ensures products are quality tested to meet their stated specifications.

Feeding recommendation

All sheep: Typical feeding rate is 150g/head/day. Optimum feeding rates depend on pasture availability and quality and the

age and condition of the sheep. The nuts can be fed at higher levels if required.

Transition onto NRM Sheep Nuts by starting with 50g/head/day, ideally for a week before building up to 150g/head/day over the following 1 to 2 weeks.

Ensure an adequate amount of forage is available at all times. Ensure sheep have access to clean drinking water at all times.

NRM Sheep Nuts contain added cobalt, iodine, manganese, selenium and zinc in addition to calcium, sodium and vitamins A, D and E. To discuss the optimum feeding levels and diet for your flock please call the NRM Nutrition Team on 0800 800 380.

Ingredients selected from

Grains, grain by-products, oilseed meals, grass seed meal, legumes, molasses, sodium bentonite, minerals, trace minerals and vitamins, vegetable oil.

Typical analysis (approximate on a dry matter basis)

Energy	12.2MJ/kg DM
Moisture	12%
Crude Protein	12.2%
Fat (minimum)	2%
Selenium	1mg/kg

The Metabolisable Energy (ME) values are calculated by a registered laboratory from an equation and are not an actual measured value. Therefore they are only a guide for predicting the energy content of a feed.

NRM Sheep Pre-Tup Nuts

NRM Sheep Pre-Tup Nuts are a high performance supplement to boost the ewe flock at tupping time.

Good nutrition is important to ensure high ovulation and conception rates, as well as fewer returns to service.

Key benefits and features

- Quality ingredients in a 10mm nut to ensure optimum utilisation and reduced wastage.
- High levels of digestible energy and metabolisable energy (ME) compared with forage from processed grains and rumen protected fat.
- Added protein from legumes and soya to supplement pasture levels which can be low over mating.
- Mycotoxin binder to reduce the impact of mycotoxins in pasture and other feeds during this crucial period.
- Contains molasses for increased palatability.

Feeding recommendation

Lighter ewes/hoggets: Typical feeding rate is 500g/head/day.

Rams and ewes: Typical feeding rate is 200g/head/day.

Optimum feeding rates depend on pasture availability and quality, and the age and condition of the sheep. Start feeding NRM Pre-Tup Nuts four to six weeks

prior to tupping and feed until tupping. To maximise benefits to the flock feed NRM Pre-Tup Nuts during tupping.

Transition onto NRM Pre-Tup Nuts by starting with 50g/head/day for a week before building up to 200g/head/day over the following week. If feeding lighter ewes and hoggets then allow another week to increase up to 500g/head/day. Feed in a line or many small piles to reduce competition, and ensure an adequate amount of forage and clean water is available at all times.

Contains nutritional levels of cobalt, iodine, copper, manganese, zinc and selenium, as well as vitamins A, D and E.

Ingredients

Grains (wheat, barley, maize), grain by-products, oilseed meals, legumes (peas, beans), molasses, sodium bentonite, minerals, trace elements and vitamins, vegetable oil, rumen protected fat.

Typical analysis (approximate on a dry matter basis)

Energy	13.5 MJ ME/kg DM
Protein	15.5%
Fat (minimum)	4%
Selenium	2mg/kg

The Metabolisable Energy (ME) values are calculated by a registered laboratory from an equation and are not an actual measured value. Therefore they are only a guide for predicting the energy content of a feed.

NRM Sheep Triplet Nuts

NRM Sheep Triplet Nuts are a high protein supplement for ewes that have been scanned as carrying triplets.

Good nutrition for triplet bearing ewes is important to ensure larger, stronger lambs, as well as high levels of milk production. They can be fed after lambing if required.

Key benefits and features

- Quality ingredients in a 10mm nut to ensure optimum utilisation and reduced wastage.
- Highly digestible ingredients at a time when rumen space and feed intake is limited due to the number of lambs.
- High protein feed with quality protein sources that provide by-pass protein for good foetal lamb growth and milk production.
- High levels of digestible energy and metabolisable energy (ME) with a combination of carbohydrates and vegetable oils.

Feeding recommendation

Triplet bearing ewes: 200g/head/day

DO NOT FEED TO SINGLE OR TWIN BEARING EWES

Optimum feeding rates depend on pasture availability and quality and the age and condition of the sheep. Start feeding NRM Triplet Nuts five weeks prior to lambing. Do not start feeding before five weeks otherwise lambs may be too big. Continue

feeding after lambing if grass quality or supply is inadequate to help support milk production or where older ewes need extra support.

Transition onto NRM Triplet Nuts by starting with 50g/head/day for a week before building up to 200g/head/day over the following week. Feed in a line or many small piles to reduce competition, and ensure an adequate amount of forage and clean water is available at all times.

NRM Sheep Nuts contain added cobalt, iodine, manganese, selenium and zinc in addition to calcium, sodium and vitamins A, D and E.

Ingredients

Grains (wheat, barley, maize), grain by-products, oilseed meals, legumes (peas, beans), molasses, sodium bentonite, minerals, trace elements and vitamins, vegetable oils.

Typical analysis (approximate on a dry matter basis)

Energy	12.8 MJ ME/kg DM
Protein	25%
Fat (minimum)	2%
Selenium	1mg/kg

The Metabolisable Energy (ME) values are calculated by a registered laboratory from an equation and are not an actual measured value. Therefore they are only a guide for predicting the energy content of a feed.



NRM MultiFeed Nuts

NRM MultiFeed Nuts are suitable for a wide range of animals including beef cattle, sheep, goats and deer.

NRM MultiFeed supports improved condition and productivity in ruminant livestock where nutrient demands are high, e.g. pregnancy, lactation, wool growth and liveweight gain.

This versatile product will also assist in sustaining stock during periods of critical feed stress.

Feeding recommendation

NRM MultiFeed is not formulated as a complete feed. Ensure that pasture or silage is always available. Always introduce new feeds gradually. Always ensure access to clean, fresh water.

Ingredients selected from

Grain and grain by-products, plant proteins, molasses, minerals, vegetable oils, mould inhibitor, vitamins, trace minerals and rumen buffer. NRM MultiFeed Nuts do not contain PKE.

Typical analysis (approximate on an as fed basis)

Crude Protein	11%
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NRM MultiFeed is also available with extra zinc to help control facial eczema in sheep.



VERSATILE



HIGH ENERGY



SUPPORTS
WEIGHT GAIN

NRM Summer Dry Nuts

NRM Summer Dry Nuts are designed to supplement pasture, especially when sheep are mature or stressed by a lack of water.

NRM feeds are part of our quality assurance programme and are quality tested to meet their stated specifications.

Key benefits and features

- Contain quality ingredients in a 10mm nut to ensure optimum utilisation and reduced wastage.
- Are formulated to 15% protein to help complement the low protein of standing hay or lower quality conserved forages.
- Include molasses for increased palatability.
- Contain a wide range of essential minerals and trace elements for flock health and production, including vitamins A, D and E and trace elements such as zinc, selenium, iodine, cobalt and manganese.
- Supplementary feeding may also help support the immune response to internal and external parasites which place additional burden on stock during a drought.

Feeding recommendation

Typically fed to sheep at 250g/head/day but can be fed at up to 500g if necessary (excluding Texel or Texel crosses which should be limited to 250g/head/day due to increased susceptibility to copper toxicity). Transition onto NRM Summer Dry Nuts

by ideally starting at 50g/sheep/day for a week before building to the desired level over the following 1 to 2 weeks.

If cattle are not currently eating a grain-based feed introduce at 0.5kg/head/day and gradually increase as required typically up to 2kg/head/day for calves and 3kg/head/day for yearlings and cows. Feed up to 2kg/head/day to deer.

Optimum feeding rates depend on pasture availability and quality relative to the condition and performance of the class of stock being fed. Introduce at low levels and increase gradually to prevent gorging by dominant individuals. Make sure all animals have access to nuts, adequate long forage and clean drinking water. Continuing to feed after a drought has been broken may be worthwhile to aid pasture recovery.

Ingredients

Grains, grain by-products, oilseed meals, grass seed meal, legumes, molasses, minerals, trace elements, PKE, vitamins and vegetable oil.

Typical analysis (approximate on a dry matter basis)

Energy	11.5MJ ME/kg DM
Crude Protein	15%
NDF	40%

The Metabolisable Energy (ME) values are calculated by a registered laboratory from an equation and are not an actual measured value. Therefore they are only a guide for predicting the energy content of a feed.



Lamb rearing

Lamb rearing

Higher lambing percentages on farm have been positive for productivity and profitability.

However, with this increase in productivity there has also been an increase in surplus and orphaned lambs. This may be due to the inability of the ewe to produce enough milk for all lambs in a multiple birth, poor mothering ability or death of the ewe at lambing. Leaving poor doing ewes with a strong single lamb or good ewes with two strong lambs rather than triplets increases the chance of finishing lambs

in a timely and profitable manner. Surplus lambs can be reared by hand on farm or sold to commercial lamb rearers or people looking for pet lambs.

The growth in commercial sheep milking flocks in New Zealand has increased the supply of ram lambs that are surplus to requirements for the dairy milk producer but a good opportunity for people looking to raise lambs. Rearing orphan lambs can also be a good way to start a flock on a smaller block and can also be a lot of fun for children.

Lamb selection

Lambs that should be selected for rearing are those that are orphaned, abandoned or from ewes that have had triplets or twins and are unable to feed all their lambs.

When reducing twins to a single, it is typically best practice to leave the largest lamb on the ewe. When reducing triplets to twins, it is best to leave the ewe with the best-matched pair.

When buying a lamb for a commercial enterprise or as a pet, the following guidelines can be used:

- Buy good quality stock from a reputable farmer.
- Lambs should be four to five days old.
- Check navels for swelling and spray with iodine to prevent navel infection.
- Lambs should appear strong, bright and healthy.
- Check lambs are not lame – check for sore/swollen joints.
- Check if the ewes were vaccinated against clostridial diseases before lambing.
- Make sure the lamb has been fed a sufficient amount of colostrum in the first few days of life, either from its mum or in the case of orphans from a bottle.
- If buying ewe-lambs to start a flock consider their breeding relative to what you want to do long term.

Dealing with hypothermia

If you pick up lambs that have been orphaned, there is a high risk of mortality from hypothermia and starvation, especially if they have been orphaned or rejected during poor weather.

Lambs with hypothermia appear weak, gaunt, and hunched up. In severe cases, the lamb may be unable to hold its head up. The ears and mouth may feel cold. The lamb may lack suckling response. The normal body temperature for lambs is 38.5°C – 39.5°C. Lambs with temperatures below 37.7°C are considered hypothermic.

A rectal thermometer can be used to assess body temperature. It is important to get colostrum in newborn hypothermic lambs as soon as possible to elevate

the body temperature. Tube feeding is an effective means of doing this. It may also be necessary to move the lamb to a warmer environment to elevate the body temperature. Some people use warming methods such as warming boxes or warming baths very successfully.

In newborn lambs, hypothermia usually results from exposure. Wind and rain greatly increase heat loss so shelter for lambing ewes can be especially worthwhile during inclement weather. In lambs over 24 hours of age, hypothermia is usually a result of starvation. Older lambs should be handled in a similar manner, except they do not need colostrum. Milk replacer can be fed with a bottle or tube feeder.

Housing

Housing can have a huge impact on lamb health. Pneumonia is very common in young lambs, and it is generally a man-made disease caused by poor housing.

Young lambs are born with little fat reserves to use to keep warm, so they are susceptible to the effects of cold, wind and rain, particularly if they don't get enough milk from the ewe or they have been abandoned. Lambs should be sheltered inside for the first three weeks after birth as cold, wet lambs will put

their energy into staying warm rather than growing. This means increased costs for feed and lamb health, as well as increased mortality. The following can be used as a guideline for lamb shelters:

- A barn or shed with separate pens is necessary. Allow one pen per 10 to 12 lambs and allocate a sick pen or pens, depending on the number of lambs that are being reared. Do not overcrowd pens.
- Pens must be dry, draught free and get good daylight. A quick test is that you should be able to have a lit candle/match that doesn't blow out at lamb height.

Housing

Lambs can be moved outdoors to pasture at three weeks of age, but should always have access to the rearing shed or covered shelter overnight or on cold days to stay warm. Consider coats or jumpers for lambs if they are outside early.



- Pens should be constructed with three solid walls using sheet metal or untreated ply. This limits nose-to-nose contact and reduces the spread of disease.
- One end should be open for good ventilation and to allow the removal of gases and ammonia from urine. There should be no ammonia smell at lamb height. Get down on your hands and knees and check.
- The open end should face leeward and north for sunshine.
- Each pen should be twice as long as it is wide to allow lambs to move to the back to get out of the wind and rain.
- There should be adequate space per lamb – allow 0.5m² to 0.6m² per lamb.
- Ideally the floor should slope downwards and out of the pen and it should be coarse gravel or sand for adequate drainage. This ensures that the spread of disease is minimised as the drainage does not flow through other pens.
- Bedding should be straw, untreated bark or sawdust. This should be spread over the entire floor in a layer that is 300mm deep. Bedding should always be fresh, clean and dry. Wet, dirty bedding is a big risk factor for pneumonia.
- The barn, pens and bedding should be sterilised with a virucidal spray before use to kill any viruses, such as Virkon™S. The virucidal spray should be safe for lambs. If in doubt please speak to your local vet.
- Have a cleaning protocol in place to ensure housing is kept clean and dry. Use a disinfectant regularly, such as Virkon™S (made into a liquid as per recommendations) EVEN IF a powdered product designed for absorbing moisture in pens is being used (the two work well together but powdered moisture absorbing products cannot replace using a liquid disinfectant).
- Each pen should contain a water trough to provide unrestricted access to water, a meal trough and a hay rack.
- Keep birds from roosting in the barn as their droppings can cause disease. When spraying with disinfectant make sure you spray in the rafters of pens as well. Birds can carry many diseases, including salmonella.



Disease management

Disease management

Scours

There are two types of scours – nutritional and infectious. With an infectious scour, a lamb will also have an elevated temperature, so testing body temperature is a good way of identifying what scour you are dealing with. Normal lamb body temperature will sit around 38.5°C – 39.5°C.

Nutritional scours

These are usually linked to changes in milk feeding routine, stress, over feeding, high concentration of lamb milk replacer or poor quality milk/milk replacer. To prevent nutritional scours, lambs should not be overfed. Diet changes should be made slowly, mixing rates of lamb milk replacers adhered to and good quality milk/milk replacers should be used. Lambs should be fed at the same time each day by the same person; consistency is the key to reducing stress.

Check your teats are in good condition, worn teats can cause milk to flow too quickly at feeding time which can cause gorging and scouring.

Infectious scours

Can be caused by bacteria (E. coli and salmonella), protozoa (coccidiosis and cryptosporidia) and viruses (Rotavirus and Coronavirus). Always consult your veterinarian when lambs start scouring to get it diagnosed by laboratory analysis, so they can be treated promptly and effectively. Lambs with an infectious scour will most likely have an elevated body temperature so it's worth taking the temperature of lambs to see what scour you are dealing with.

The initial treatment for either nutritional or infectious scours is similar, with hydration being the primary focus. Lambs should be removed from milk in severe cases of scours and fed electrolytes. For a more minor to moderate scour, it is best to keep at least one milk feed in the lamb's diet a day. The electrolytes should provide the lamb with energy and water and replace body salts that have been lost through scouring. Remember that while electrolytes are important for replacing body fluid, they do not contain the nutrients required for growth so ensure lambs are put back on lamb milk replacer as soon as possible.

It is important to remember that lambs die from dehydration and lack of energy, not the scours themselves. With serious infectious scours, medication prescribed by your veterinarian might be required in addition to electrolytes.

Coccidiosis

Coccidiosis is caused by protozoa that destroy the finger-like villi in the small intestine that absorb nutrients. The worst cases of coccidiosis will have bloody scours, but most lambs won't have any visible signs and will just have lower growth rates. NRM Lamb Feeds (Lamb Start Mix and Lamb Performance Pellets) contain Deccox®, which is a coccidiostat that is registered for use in lambs in New Zealand. A coccidiostat is good to have in a lamb feed as it kills the coccidiosis protozoa at several stages of the life cycle which helps to prevent coccidiosis becoming a significant issue, while still allowing the animal to develop immunity against the disease.

Disease management

Abomasal Bloat

Abomasal bloat is caused by bacteria in the gut producing excess gas. Warm milk entering the abomasum produces an ideal substrate for these bacteria to ferment the milk, producing gas, so be careful not to overfeed milk. The excess gas causes the abomasum to expand and rupture resulting in death. Abomasal bloat is a major cause of death amongst lambs caused by sudden gorging of milk – especially close to weaning if larger, greedier lambs can steal more than their share. Be prepared to remove lambs that drink fast from multiple milk feeders quickly to prevent them getting too much.

Abomasal bloat can be prevented by mixing yoghurt with lamb milk replacer. The New Zealand Sheep Council and veterinarians suggest gradually introducing a milk/yoghurt mixture from days five to seven, with a gradual transition from warm to cold milk feeding. For further information on mixing rates please visit the Beef and Lamb New Zealand website www.beeflambnz.com

Pneumonia

Pneumonia is an infection of the lung tissue caused by various bacteria, viruses and parasites of the upper and lower respiratory tract and it is very common in artificially reared lambs. Pneumonia can damage a young animal's lungs and have a big impact on how they perform in the future. Signs include coughing, runny nose, rapid or laboured breathing, fever and not feeding.

Pneumonia is caused by a variety of things, with most of them being issues in the environment that cause a build up of ammonia;

- Poor ventilation
- Wet, dirty bedding
- Over crowding
- Viruses
- Excessive dust
- Stress

To prevent pneumonia make sure you set up and maintain your rearing sheds well so you minimise the risk of ammonia building up. If you are smelling ammonia at lamb height, work on ways to minimise it.

Health and welfare tips and tricks

- Ensure that lambs have a daily routine, with the same person feeding them every day. The rearer should be quiet and relaxed around the lambs to reduce stress, meaning they will be more likely to drink their share of milk.
- Make sure there is adequate access to fresh water at all times.
- Dip navels with iodine when lambs enter the shed and keep an eye out for navel infections. Navel ill can be a problem in reared lambs.
- Scouring lambs should be given electrolytes as they can quickly succumb to dehydration. Scouring may be caused by the diet (a nutritional scour) or by an

infection (normally accompanied by raised temperature and requires antibiotics to treat). Use a thermometer to check the temperature of scouring lambs so you know what issue you are dealing with. A lamb with an infection will have an elevated temperature (above approx. 39.4°C). Check a healthy pen mate's temperature for comparison.

- Have a vaccination program in place. Infections and diseases spread much quicker when lambs are reared in close quarters so it's best to prevent as many as possible (e.g. scabby mouth). Talk to your vet about your specific requirements.
- Handle lambs with care. They are neonates and the way you treat them in even their first day of life can have bigger health impacts. Reduce stress as much as possible and if transporting them use trailers that have adequate bedding and are as dry and warm as possible.
- Attention to detail, consistency and good observation pay dividends and are critical when rearing lambs.
- It's a good idea to use some form of lamb identification i.e. a coloured neck tie so that sick lambs/slow drinkers can be easily identified and treated accordingly.
- Prevent problems as much as possible by good nutrition and management but respond to problems quickly if they arise.

It is good practice to monitor lambs' health and behaviour daily so that you can pick up on issues early and intervene as soon as possible.

It can be a great idea to have an animal health notebook you jot down any changes in, especially if more than one person helps rear the lambs. Feeding time is a good time to watch the lambs and observe behaviour, but even if you have automatic milk feeders in your system, still take the time daily to check on lambs.

Some signs of a sick lamb to look out for:

- Refusing to drink the milk feed/coming on and off the teat/slow feeding
- Standing apart from the group
- Coughing
- Cold to the touch
- A rectal temperature outside the normal range which is 38-39.5°C
- A swollen navel and/or stiff joints (could be navel infection)
- Scouring
- Nasal discharge
- Lethargy/weakness
- A run to the eye
- Dull/sunken eyes (could be dehydration)

Biosecurity and hygiene

It is cheaper and easier to prevent disease rather than cure it.

The following is a guide to help prevent disease:

- Control the flow of people in and around the sheds and only allow access to essential people.
- Keep visitors away from the lambs.
- Have dedicated equipment for the lambs and ensure that it is kept clean. This includes wearing clean clothing and boots in the shed.
- Always wash hands with soap and warm water before and after handling lambs, feed and feeding equipment.
- Keep sick lambs in a separate pen away from the others. If possible ensure that the sick pen has solid sides to limit the transfer of disease.
- Have a spray programme in place with a safe, quality virucidal spray such as Virkon™S.
- Ideally rear lambs in sheds that have not been used by adult sheep (sheep yards or woolsheds). Situate the lambs away from ewes as they can be carriers of disease. It is important to remember that lambs lack a fully developed immune system so they will become sick more easily than ewes.



Colostrum

It is critical that lambs receive colostrum as soon as possible after birth as it contains essential nutrients and antibodies for survival and growth.

Lambs are born without an active immune system so are highly vulnerable to infection if they don't receive enough colostrum.

Colostrum is important because it is a rich source of:

- Immunoglobulins (antibodies) – these provide passive immunity and help fight infection.
 - Fat and lactose – this provides energy as the newborn lamb is born with low energy stores and poor insulation.
 - Protein – for protein synthesis and muscle growth.
 - Vitamins and minerals – lambs need high levels of vitamins A and E for health and immunity.
-

Lambs should receive their first feed of colostrum in the first six hours of life and 10% to 12% of their body weight should be fed in the first 12 hours. Provide this frequently (every four to six hours) in small amounts warmed to body temperature. If lambs are weak and slow to suckle then tube feeding colostrum may be necessary. Getting colostrum into lambs quickly following birth is extremely important for the absorption of immunoglobulins. If left too long after birth, their gastrointestinal

system starts to lose the ability to absorb the immunoglobulins. So, for lambs that are a 2+ days old when they are orphaned, you have missed the window of opportunity for colostrum feeding.

Orphan lambs are at greater risk of not consuming colostrum than twins or triplets that are deliberately removed from ewes that are failing, so orphans need closer attention.

Colostrum should be good quality with high levels of antibodies. If possible, colostrum should be from a ewe; however, cow colostrum can be used if no other is available. Packaged colostrum can also be used if there are no alternatives, but keep in mind that fresh is best if the quality is good.

A supply of frozen cow colostrum can be kept on hand for when there is no fresh colostrum available. Care should be taken that frozen colostrum is thawed gradually in a warm water bath – do not use a microwave. Overheating the colostrum (over 55°C) will destroy the antibodies and supply less immunity to the lamb.

Lambs should receive colostrum for the first three to four days after birth before changing to milk or lamb milk replacer. If feeding packaged colostrum, ensure there are sufficient fat levels for feeding for three to four days. If not, then lambs may need to be changed on to milk or lamb milk replacer earlier.

Milk feeding

It is essential that milk powder provided to lambs is good quality.

Milk powder should contain ingredients that have been selected for digestibility, solubility and stability for easy mixing in warm water, and optimum digestion by the lamb. Most importantly the milk replacer formula must be palatable and meet all the nutrient requirements of the lamb. A lamb milk replacer designed for lambs is the best option.

Calf milk replacer is not ideal as the copper and lactose levels may be too high for lambs.

- Do not allow lambs to 'guts out' and consume too much milk in one sitting. If using traditional feeders watch the lambs feed and pull them off as they begin to become overfull. Lambs that over consume milk in one sitting can develop abomasal bloat which can kill very rapidly. Even on ad lib feeding machines, ensure that there is never a period of the day when the machines are unavailable to lambs as any 'urgency to feed' created in lambs can result in over consuming milk and potentially bloat.
- Adding yoghurt to milk has been found to reduce the severity and incidence of bloat so is worth considering if you're having bloat issues (see page 28 for more info).

Some tips for milk feeding

- Mix up the milk replacer according to manufacturer's instructions and do regular checks to ensure you are mixing up the milk correctly (get some kitchen scales and measuring jugs for accuracy).
- Lambs prefer less volume of milk in more feeds during the day as it is closer to their natural suckling behaviour. Ad lib feeding machines can work very well for this reason.
- If feeding using multi lamb feeders or bottles be prepared to feed lambs 3-4 times a day (depending on your system and age of lambs). Ensure you watch out for slow and fast feeders and rearrange lambs into their respective groups to ensure there is less competition at feeding time.

Weaning

Lambs can be weaned off milk when they are about 10-15kg (depending on breed) and when they are consuming at least 200 grams of lamb hard feed per day. The intake of the hard feed is critical as it is a reflection of how well their rumen has developed. Be prepared to hold back lambs that are not meeting the weaning criteria. Ensure that pasture on offer is good quality to encourage continued good growth rates. Do not change the hard feed around weaning. Keep feeding a good quality lamb hard feed for four weeks post weaning, or longer if pasture is limited or poor quality.



Rumen development

In the mature ewe, a large percentage of carbohydrates and proteins in pasture and supplements are digested by microbes in the rumen to produce volatile fatty acids (energy) and protein for use in maintenance, milk production or pregnancy.

Lambs however are born with an undeveloped rumen and large abomasum. This large abomasum is important for digesting and obtaining nutrients from milk or milk replacer. It is essential that the rumen develops to be the main stomach where digestion takes place. Profitable and successful lamb rearing relies on weaning the lamb at the youngest possible age without hampering growth rates. This means the lamb must be provided with the proper ingredients for rumen development so it can utilise the most amount of grass at weaning and minimise any potential growth checks.

The requirements for rapid rumen development are similar to calves. These include:

- **A high quality lamb feed that contains high levels of starch (such as NRM Lamb Start Mix or NRM Lamb Performance Pellets) – these are often referred to as ‘hard feed’.** Hard feeds do not stimulate the closure of the oesophageal groove, so the feed is deposited in the rumen where it stimulates rumen development. Starch promotes the growth of the population of microbes

in the rumen, and in particular those that produce volatile fatty acids (energy). In turn these volatile fatty acids stimulate the development of rumen papillae, which are finger-like projections that absorb nutrients. The longer and denser the rumen papillae, the more energy the lamb will get from grass and pellets at weaning. The more we can prepare lamb's rumens before the milk feed is taken away and they have to rely more heavily on pasture to get their nutritional requirements, the better they will do. It is also a good idea to keep a hard feed in over the weaning period and beyond to support lambs while on pasture.

-
- **Good quality clean hay.** Hay promotes the development of the muscles that surround the rumen, as well as rumen size. This is important for encouraging rumen motility and feed movement around the rumen for digestion. However, feeding too much hay can be a problem as it can fill up the developing rumen and decrease hard feed intake. Offer hay, but make it harder for the lambs to get (e.g. stuffed into a hay rack or netting) so they can pull out a little bit, but not gorge on it.
 - **Clean water.** The microbes in the rumen require water to survive. Milk or milk replacer is not free water as it bypasses the rumen via the oesophageal groove. Water helps with the absorption of volatile fatty acids and stimulates the intake of lamb feed. Water should be clean and fresh to reduce the risk of pathogens and disease.
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Top tips for hard feeding lambs

- Offer a hard feed (e.g. lamb muesli or pellets) during the first week of life. This ensures the lambs get used to the taste of the feed. Intakes will be small at first but will increase as lambs get older – this early period is a training period for getting them used to the hard feed.
- Always go for a lamb specific feed as it is better suited for lambs as opposed to a calf feed which may be too high in copper and could cause copper toxicity in lambs.
- Avoid false economies – palatable hard feed which helps support health and performance is a good investment.
- Avoid hard feed that has any by-product type ingredients such as palm kernel, copra or tapioca – lambs do not like the taste and will eat less of these feeds.
- Keep feed troughs clean and don't put lots of hard feed out and leave it to go mouldy and contaminated by vermin/birds. A small amount of fresh feed every day is best and increase the amount offered to match intake.
- Ensure there is enough room at hard feed troughs so that all lambs can eat at once if they choose.
- After feeding milk, lambs have a strong desire to consume, so putting some hard feed in their mouths can help to get them used to the taste and texture of hard feed.
- Ensure stored feed is kept out of direct sunlight in a dry, vermin free environment.
- Also offer some long fibre i.e. hay/ straw but ensure that lambs do not over consume the long fibre source as it can decrease hard feed intake. This can be a particular problem if very palatable long fibre is sourced. A good idea is to make the long fibre a little harder to eat by putting it in a hay rack for example





NRM lamb feed range

NRM lamb feeds

It is important to provide lambs with good quality lamb feeds that are highly digestible, contain balanced levels of energy, protein, minerals and vitamins, and that promote rumen development and lamb growth.

NRM has two lamb feeds in the range. NRM Lamb Start Mix (page 39) is a muesli style feed that is a popular choice for young lambs as a first hard feed as it is a molassed, muesli style textured feed that is very appealing to animals.

As lambs get older and their hard feed intake increases, it can be a good idea to transition them over to a pelleted feed such as NRM Lamb Performance Pellets (page 40), this is because there tends to be less wastage with a pellet when feeding in paddock and older lambs tend to consume more of feed when it's in a pelleted form.

There is no hard and fast rule though and some lamb rearsers prefer to keep feeding the Lamb Start Mix for a longer period.

Both NRM lamb feeds are high quality and contain no palm kernel, copra or tapioca – research has shown that it is false economy to use these raw materials in lamb hard feeds as it decreases the palatability of the feed. NRM lamb feeds have been designed specifically for lambs so the level of trace elements and vitamins reflect the requirement, and there is no risk of copper toxicity.

Both feeds also contain Deccox®, which is a coccidiostat that is registered for use in lambs in New Zealand. It's a good idea to opt for a lamb hard feed with a coccidiostat as it is an easy way to help prevent coccidiosis, which is a common parasitic infection (see page 27 for more information).



NRM lamb feeds



What's in NRM lamb feeds?

- **Quality Ingredients**

NRM lamb feeds contain quality ingredients that have been selected to provide a highly digestible feed to lambs. Ongoing testing and monitoring of these ingredients ensures that NRM lamb feeds are consistently high quality and meet their stated specifications. Take care when comparing different brands of lamb feed that the products are of similar digestibility and contain the same levels of nutrients. A lamb feed may appear cheaper, but because the digestibility is lower, lambs get less out of the feed and more is required to get the lamb to weaning weight. This means the cheaper feed is less economical in the long run.

- **A balance of energy and protein**

NRM lamb feeds contain a balance of protein and energy. The protein used in NRM lamb feeds is high quality with good levels of rumen bypass protein. No palm kernel meal is used in NRM lamb feeds.

- **Essential Oils**

NRM lambs contains a special blend of essential oils, which are plant extracts that have a positive effect on feed intake and growth rates.

- **Vitamins and minerals**

NRM lamb feeds contain a wide range of vitamins, minerals and trace elements. This includes vitamins A, D and E, as well as trace minerals such as cobalt, copper, selenium, iodine, manganese, iron and zinc, which are essential for lamb growth and health.

NRM Lamb Start Mix

Suitable for young milk-fed lambs from four days of age. NRM Lamb Start Mix with Deccox® 6% is a high quality, nutritious textured starter feed formulated to allow young lambs to achieve their full potential.

Feeding recommendation

NRM Lamb Start Mix with Deccox® is specifically formulated for feeding orphaned lambs, or surplus lambs in both commercial and lifestyle farming operations. It can be fed as a creep feed to lambs still on ewes, prior to and after weaning. It is well suited for lambs from 4 days after birth, (after good colostrum intake has been achieved), through until after weaning. Alternatively, if wishing to for economic reasons, transition onto NRM Lamb Performance Pellets with Deccox® at three weeks, and continue feeding until after weaning. Creep feed to lambs on ewes prior to and after weaning, aiding the transition onto a pasture only diet.

Introduce gradually to avoid digestive upsets. Offer dry, fresh NRM Lamb Start Mix with Deccox® daily in clean troughs. Ensure fresh, clean drinking water is always available. Check lambs regularly for any signs of scouring, bloating and lack of appetite, seeking qualified assistance where necessary.

Ingredients

Cereal grains (wheat, maize, barley and triticale), cereal by-products, legumes, lucerne chaff, oilseed meals, by-products, molasses, vegetable oil, minerals, vitamins, essential oils, flavour, organic acids, Deccox® 6%.



COCCIDIOSTAT



PKE FREE



MINERALS
& VITAMINS

Typical analysis

Crude Protein	19%
Crude Fat	3%
Selenium	1mg/kg
Energy	12.8MJME/kg

(Approximate on a dry matter basis)

NRM Lamb Performance Pellets

NRM Lamb Performance Pellets with Deccox® 6% are a high protein, readily digestible energy formulation designed to encourage good rumen development in young lambs and aid in the prevention of coccidiosis.

Feeding recommendation

It may vary with different breeds and farming practices. As a supplement to milk feeding, feed NRM Lamb Performance Pellets with Deccox® ad lib from 4 days of age. Healthy lambs older than 4 weeks of age, over 9kg body weight, and typically eating 200g/head/day of NRM Lamb Performance Pellets with Deccox®, may be weaned off milk and onto pasture. After weaning, slowly reduce pellet intake over the next 6 weeks to a minimum of 85g NRM Lamb Performance Pellets with Deccox®/head/day.

Introduce gradually to avoid digestive upsets. Offer dry, fresh NRM Lamb Start Mix with Deccox® daily in clean troughs. Ensure fresh, clean drinking water is always available. Check lambs regularly for any signs of scouring, bloating and lack of appetite, seeking qualified assistance where necessary.

Ingredients

Cereal grains (wheat, maize, barley and triticale), cereal by-products, legumes, oilseed meals, by-products, molasses, vegetable oil, minerals, vitamins, essential oils, flavour, organic acids, Deccox®.



COCCIDIOSTAT



PKE FREE



MINERALS
& VITAMINS

Typical analysis

Crude Protein	19%
Crude Fat	3%
Selenium	1mg/kg
Energy	12.8MJME/kg DM

(Approximate on an a dry matter basis)



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Notes

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Nobody is closer to your animals than you – and nobody understands their unique nutrition needs more than our qualified NRM nutritionists. It's their expertise that make our range of feeds some of the most scientifically advanced in the market. Plus having nationwide access to their in-depth knowledge will support your understanding of animal nutrition to improve the productivity and profitability of your farming operation.

If you have any queries please contact us.

0800 800 380
nrm.co.nz

