



# EWE NUTRITION

*Tech guide*



**FOCUSING ON EWE NUTRITION & MANAGEMENT  
BEFORE & AFTER LAMBING**

**Dugdale  
Nutrition**

## Introduction

Ewes have the greatest nutritional demand in late pregnancy and early lactation. It is essential that the ewe is fed to meet her requirements in this period to reduce the amount of problems at lambing time and to optimise lamb performance. However, it is also important not to over feed the ewe as this can also cause problems such as dystocia and prolapses. This booklet has calculations to help you feed your ewes correctly.

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## Objectives of Ewe Nutrition

- Optimise conception rate and embryo survival
- Increase lamb numbers and improve survival rate
- Produce stronger, more viable lambs
- Ensure good quality and quantity of colostrum and milk
- Optimise lamb growth rate and the weight of lamb weaned per ewe
- Finish lambs when they are growing most efficiently
- Ensure ewes are healthy and to minimise losses
- Reduce flock replacement costs
- Improve flock profitability

The most cost-effective way to meet the nutrient requirements of the ewe is to maximise the contribution of forage, including grazed and conserved grass, brassicas and roots.

Closer to lambing, when nutrient demands are high, the best quality forage should be offered. This will maximise intake and reduce the need for supplementation.

Both underfeeding and overfeeding can have negative impacts on productivity.

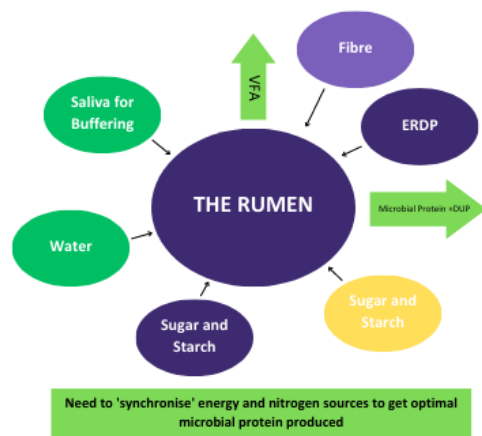
## Key Performance Indicators

- Ewe to ram ratio - number of ewes each ram serves - target more than 60
- Scanning percentage
- Empty ewes at pregnancy scanning - target less than 2%
- Lambs born alive per 100 ewes put to the ram
- Lambs turned out per 100 ewes put to the ram
- Lambs reared per 100 ewes put to the ram
- Ewes mortality - target less than 4%
- Lamb losses from scanning to weaning - target less than 15%
- Lamb 8 week and weaning (90 days) weights



## Ruminant Nutrition

Good rumen function is fundamental to the health and productivity of the ewe at all stages of the production cycle.



Feed is eaten by the sheep, digested and fermented by the rumen microbes to produce short chain fatty acids and microbial protein.

Short chain fatty acids are absorbed through the rumen wall and are used by the sheep for energy. The microbial protein is digested and absorbed in the small intestine. The microbes provide the sheep with energy, protein, vitamins and other nutrients, which are essential for cell maintenance and production.

Stable rumen function is important for the well-being of the ewe. Any change in feed type or quantity should be gradual and feeding should be at the same time each day.

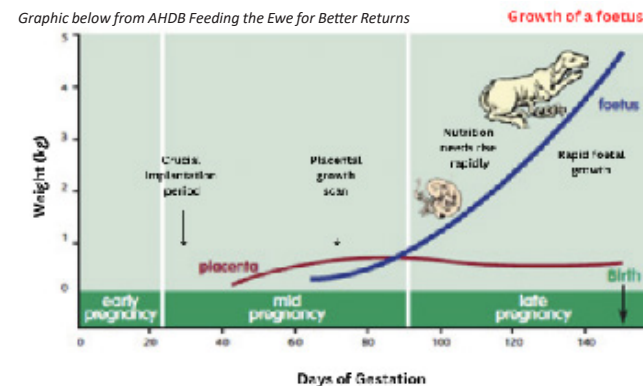
- ❌ Avoid any sudden changes in food type, eg. introduction of concentrates, change of forage or feed quality
- ✅ Feed whole grain, rather than crushed or ground cereals to slow fermentation in the rumen
- ✅ Maintain constant frequency and timing of feeding
- ✅ Minimise stress by planning events to avoid periods of no feed intake
- ✅ Maintain good health
- ✅ Ensure all ewes have adequate access to feed to reduce the number of ewes overeating and others not having sufficient food



## Ewe Requirements

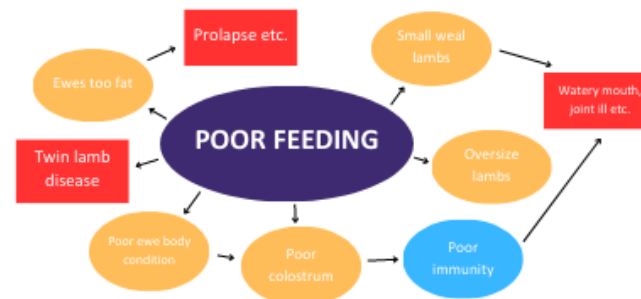
### Growth of a Foetus

In early pregnancy there is little change to the nutritional requirement of the ewe and changes to the level or type of feed should be avoided. Months 2 and 3 of the pregnancy is when most of the placenta development takes place and the foetus remains small. It is the placenta development which impacts the lamb's birth weight, survival and growth rate. In late pregnancy, the ewes nutritional requirement is the greatest because this is when the lambs development increases and preparation for milk production occurs.



### Poor Feeding

Remember the importance of feeding at the correct level, not too much or too little, in mid-pregnancy this impacts on placental growth and determines final lamb size. In late-pregnancy incorrect feeding increases the risk of metabolic issues and lamb diseases as well as affecting colostrum quality.



## Ewe Requirements

### Dry Matter Intake (DMI)

Dry Matter Intakes as a % of body weight.

Pregnancy 2-2.5% liveweight, intake increases with more digestible, better-quality forage.

Lactation 3.5% liveweight.

Trough space = 15cm/ewe ad-lib forage  
= 45cm/ewe if restricted concentrates

Better to scatter feed if area clean and dry - helps reduce the risk of prolapses.

### Energy Requirement

Energy requirements for ewes at the last 2 weeks of pregnancy.

Calculate liveweight of the ewe and take 10% of that + 3 = maintenance requirement in MJ.

Add 4MJ for each lamb carried.

Work back feeding levels from this to build up over 6-8 weeks if requirement high or 3-4 weeks if only small quantities needed.

|                       |  |             |
|-----------------------|--|-------------|
| Maintenance           | (LW/10) +3   | 10 MJ / day |
| Gestation (last week) | 4MJ / lamb carried = +8 for twins  | 18 MJ / day |
| Lactation             | Need 7MJ / litre of milk.<br>For twins 3 litres in week 3 of lactation = +21MJ | 31 MJ / day |

## Factors Affecting Dry Matter Intake

### Growth of a Foetus

- Forage Digestibility - the higher the digestibility of the feed, the higher the intake, as food is broken down more quickly and has a faster rate of passage through the rumen.
- Chop length of forage - short chop forages encourage higher intakes than longer or unchopped material.
- Access to feed - feeding space, competition, freshness and quality of feed, timing and frequency of feeding.
- Shy feeders - some ewes, especially young animals, should ideally be penned separately to ensure they are not prevented from feeding, or ensure all ewes have access to all feed at the same time, if not fed ad-lib.
- Mineral/trace element deficiency - some deficiencies can reduce the activity of the rumen microbes and feed intake.
- Rumen turnover rate - in the late stages of pregnancy the effective volume of the rumen is reduced as the foetuses increase in size. This can lead to a reduction in intake if the diet is based on poorer quality forage. With good quality forage, the rate of passage through the rumen increases, so intake does not fall significantly.
- Lactation - intakes during lactation are much higher in line with the huge demand for energy. Without the restriction of the foetuses, feed intake increases rapidly after lambing.
- Ill health - endo and ecto-parasite infestations and mineral deficiencies can reduce feed intake.
- Grazed forage - intake is influenced by the chemical composition and digestibility of the herbage as well as its physical structure and distribution. Intake of herbage is affected by bite size, bite rate and grazing time.



### Requirements

These are some mineral and vitamin requirements for sheep in their diet. Some of this will be provided in background levels in forage and concentrates.

| Nutrient        | Class of Sheep and Their Requirements (in diet Dry Matter) |                 |               |            |
|-----------------|--|-----------------|---------------|------------|
|                 | Good Forage  | Mature Ewe      |               | Young Lamb |
|                 |  | Early Pregnancy | Nursing Twins | Fat Gain   |
| Calcium %       | .45  | .25             | .4            | .55        |
| Phosphorous %   | .40  | .2              | .3            | .25        |
| Potassium %     | 2.0  | .5              | .8            | .6         |
| Magnesium %     | .25  | .12             | .18           | .12        |
| Sulfur %        | .25  | .15             | .25           | .15        |
| Sodium %        | .0005  | .10             | .15           | .10        |
| Iron, PPM       | 100  | 40              | 40            | 40         |
| Copper, PPM     | 8  | 10              | 10            | 10         |
| Manganese, PPM  | 70   | 40              | 40            | 40         |
| Zinc, PPM       | 30   | 30              | 30            | 30         |
| Selenium, PPM   | .15  | .3              | .3            | .3         |
| Vit A, IU/lb DM | 50.000   | 1000            | 1200          | 500        |
| Vit D, IU/lb DM | 500  | 100             | 100           | 100        |
| Vit E, IU/lb DM | 10   | 7               | 7             | 7          |

Deficiency of minerals can cause many problems, especially in pregnant ewes but it is also important not to overdose with minerals. Below are some effects of mineral deficiencies.

**Calcium** - Hypocalcaemia, rickets

**Magnesium** - Hypomagnesaemia, nervous irritability and convulsions

**Copper** - Anaemia, poor growth, loss of hair pigment, sway back

**Iodine** - Hair loss, weak or still born lambs

**Selenium** - White muscle disease, ill thrift

Correct calcium and magnesium levels in late pregnancy and early lactation are required to prevent metabolic disease.

The most important trace elements for sheep in the UK are copper, selenium, cobalt, iodine and zinc.

- Requirements vary with the level of production.
- If blood testing is recommended at least 8 sheep per management group should be tested.
- Deficiency should be confirmed by several tests and independent advice.
- Grass and forage varies widely in trace element content due to soil type, pH, drainage, plant species and fertiliser use.
- Clay soils generally have higher trace element levels than sandy soils.
- Soil testing can reveal gross deficiencies, but should only be used as a guide.
- Herbage analysis needs careful interpretation.
- Diagnosis of a deficiency should be confirmed by monitoring the response to supplementation.
- Over-supplementation can cause toxicity or other undesirable consequences.
- Methods of on-farm supplementation include free access minerals, in-feed minerals, drenches, slow-release boluses, injections or top dressing of pasture.

There is variability in breeds of sheep regarding their susceptibility to deficiencies.



### 1. Forage Intake

Firstly work out the dry matter (DM) intake of forage of your ewes depending on the forage being fed, e.g. 70 kg ewe fed good hay in the last 3 weeks of pregnancy:

$$70 \times 2.25\% = 1.575 \text{ kg DM}$$

To get this amount 'as fed' you need to divide the dry matter by the percentage dry matter of the forage, e.g.  $1.575/85\%(\text{hay}) = 1.85 \text{ kg hay}$ .

### 2. Energy from Forage

Then work out what energy this will provide from the energy level of your forage, e.g. Good Hay ME= 9.5MJ/kgDM:

$$1.575 \text{ kg DM} \times 9.5 \text{ MJ} = 15\text{MJ}$$

### 3. Difference in Energy

From the requirement table above this 70 kg ewe, if carrying twins, in the last 3 weeks is likely to need approximately 18 MJ so we need to work out how much she is short:

$$18 - 15 = 3\text{MJ}$$

### 4. Concentrate Needed

We then need to work out how much concentrate will be needed to match this shortage. If we take an average concentrate of ME 12.5 MJ/kgDM and 86% dry matter:

Dividing the energy shortage by the energy of the concentrate will give us the dry matter to be fed:

$$3/12.5 = 0.24\text{kg DM}$$

To then get this to 'as fed' basis=  $0.24/86\% = 0.28 \text{ kg concentrate per ewe per day}$ .

If higher feeding levels are required then feeding twice a day is useful as the concentrate feeding lowers the pH in the rumen and reduces rumen microbe activity.

### A Good Compound

- > 13MJ/kg DM
- Protein dependent on forage
- 6% DUP
- 4.5 to 5.5% oil
- <10% fibre
- <10% ash
- Good quality protein– 15% soya
- Cereals at 20%
- 150mg/kg Vitamin E
- 0.5mg/kg Selenium
- Good, consistent supply

### Home Mixes

Below are a couple of examples of home mixes:

| KG / Tonne        | 16% Protein | 18% Protein |
|-------------------|-------------|-------------|
| Barley / Wheat    | 675         | 625         |
| Sugar Beet / Oats | 100         | 100         |
| Soya Bean Meal    | 175         | 225         |
| Mineral           | 25          | 25          |
| Molasses          | 25          | 25          |

### Water

The forage and concentrate can be correct to meet the requirements of the ewe but an important part of the diet is water.

- Ensure clean, fresh and readily available.
- Sheep pre-lambing will drink 6 litres per day.
- Sheep post-lambing will drink 8 litres per day.



## Body Condition Score (BCS)

A vital management tool is Body Condition Scoring, especially when making decisions for feeding. BCS is an assessment of muscle and fat cover and the points on the sheep to assess are the spine and the last rib in the loin.



### Score 1

The spinous and transverse processes are prominent and sharp. The fingers can be pushed easily below the transverse bone and each process can be felt. The loin is thin with no fat cover.



### Score 2

The spinous processes are prominent but smooth, individual processes being felt only as corrugations. The transverse processes are smooth and rounded, but it is still possible to press fingers underneath. The loin muscle is a moderate depth but with little fat cover.



### Score 3

The spinous processes are smooth and rounded; the bone is only felt with pressure. The transverse processes are also smooth and well-covered, hard pressure is required with the fingers to find the ends. The loin muscle is full and with moderate fat cover.



### Score 4

The spinous processes are only detectable as a line. The ends of the transverse processes can not be felt. The loin muscles are full and rounded and have a thick covering of fat.



### Score 5

The spinous and transverse processes cannot be detected even with pressure; there is a dimple in the fat layers where the processes should be. The loin muscles are very full and covered with very thick fat.

Here are the recommended target BCS from AHDB:

|                   | Lowland Ewe | Hill Ewe |
|-------------------|-------------|----------|
| Weaning           | 2.5         | 2.0      |
| Mating            | 3.5         | 2.5      |
| 3 Months Pregnant | 3.0 - 3.5   | 2.5      |
| Lambing           | 3.0 - 3.5   | 2.5      |

There is some data suggesting a positive correlation of BCS with the weight of lamb weaned with:

- BCS at mating and weight gain from weaning to mating
- BCS at scanning and lambing
- Loss of BCS from lambing (fit ewes) or gain of BCS (thin ewes) to weaning



11.

## Weaning to Mating

### Key Objectives

- Achieve the correct BCS for mating
- Aim for the optimal ovulation rate
- A low-empty ewe rate-target less than 2%
- At least 75% ewes holding to first cycle
- Ewe lambs being more than 60% of mature weight at mating
- Shearlings being more than 80% of mature weight at mating

### Actions

- Wean in time to allow recovery of BCS by mating-allow at least 10 weeks
- Plan grazing and feeding
- Calculate requirements and DM available as grazing
- Body condition score ewes at weaning and split into at least 3 different groups-thin, fit and fat
- Offer best grazing to ewes with lowest BCS
- Assess groups every two to three weeks and reassign if necessary
- Highly prolific ewes must be in correct BCS for mating, with no flushing
- Only flush ewes below target BCS before mating
- Plan ewe feeding groups, establishing new groups at least 10 days before rams are introduced
- If thin ewes on good grazing do not gain condition after 3-4 weeks, investigate health with adviser or vet

### Key Nutritional Requirements

### Threats

|   |   |
|---|---|
| Correct BCS is the key objective. Response to flushing is determined by BCS and confined to ewes below target.                      | Inability of ewes to gain BCS due to shortage of DM, eg. dry period too short.  |
| Grass requirement is 1kg DM of late summer/autumn grass at 10MJ/kg DM of ME and 90g MP. This equates to maintenance for a 70kg ewe. | Grass quality may not be high enough to increase BCS alone. Ewes should have priority over the better grass than lambs.         |
| Leaner ewes will eat up to 30% more DM, which must be factored into grazing plans.  | Pushing thin ewes to over-flush can result in triplets. May need to avoid too many triplets in older ewes by limiting flushing. |
| Do not feed legume or red clover pasture or silage 45 days before or after mating.  | Short-term and long-term fertility issues.  |
| Cobalt and selenium deficiency can be a factor, but over-supplementation is of no benefit.  | Deficiencies result in lower ovulation rate and ovum quality (cobalt) and infertility (selenium).                               |

12.

### Key Objectives

- Ewes start at target BCS and maintain this level for 90 days
- Survival of fertilised ova and successful implantation and pregnancy
- Development of the placenta to allow for optimal lamb birthweight and survival
- Avoid any long-term effects of under-nutrition/ over-nutrition
- Target of less than 2% empty ewes at scanning

### Actions

- Plan ahead-calculate requirements and DM available as grazing
- Avoid any sudden change in grazing or feeding and avoid unnecessary handling until at least one month after ram removal
- Factor in any supplemental or change in feed carefully throughout this period
- Carry out a BCS check of ewes when rams are removed
- Ewe lambs and shearlings should be kept in separate groups from adult ewes. This means the young ewes can continue to be fed for growth
- Raddle rams with different colours, change them every 7-10 days, check on tupping progress and help improve the accuracy of late pregnancy feeding

#### Key Nutritional Requirements

#### Threats

|  |  |
|--|--|
| Maintenance level of energy and protein for ewes in target BCS.  | Avoid sudden changes in diet level or type. Maintain diet constant with no change from mating to one month after rams removed. |
| Grazing contribution with 1kg of autumn grass DM, supplying 10MJ of ME and 90g of MP.                    | Do not underfeed or overfeed. No more than plus or minus 10% of maintenance requirement.                                       |
| Leaner ewes will have a greater appetite (up to +30%) and this must be factored into grazing allowances. | Avoid running short of grass and having to make change in diet.  |
| Stable level and type of nutrition for first month after rams removed.                                   | Sudden changes can affect embryo development and implantation.   |

### Protein Requirement

The type of protein as we get close to lambing is more crucial than the overall quantity. Most sheep will be fed adequately with an 18% compound. If on straw will need higher level. Digestible undegradable protein such as soya is crucial in the last 2-3 weeks before lambing to optimise colostrum and milk quality and quantity.

Requirements for energy and protein are determined by ewe weight and BCS, number of lambs carried and whether the ewe is gaining, losing or maintaining weight.

Around lambing the higher worm egg output from some ewes is a source of pasture contamination for lambs. Around lambing the ewe's immune system is put under pressure and as the protein supplies are partitioned, the immune system is given a lower priority than milk production. This is known as the peri-parturient relaxation in immunity.

Maintaining good levels of body condition with adequate energy and metabolisable protein supply will reduce the impact of the peri-parturient relaxation in immunity and help control her worm burden and faecal egg output, reducing the source of contamination for grazing lambs.

Current advice is to only worm ewes if this is really necessary, and even then this would only be thin ewes and those carrying multiple lambs.

### Other Health Considerations

Ensure clostridial vaccinations are done and up to date at least 4-6 weeks pre-lambing to ensure good transfer via colostrum to the lambs.

Monitor and review foot health-use the 5 point plan!

Any ewes aborting should be isolated with careful disposal of any aborted materials. Test the foetus and placenta to diagnose the cause. Post-lambing ewes can be blood tested to also help establish causes of abortion. Do not mother ewe lambs onto aborted ewes.

Record all losses and treatments of ewes and lambs, including, prolapses, mastitis, joint ill, navel ill, watery mouth etc.





## Housing Requirements

### Lying Area Allowances

| Type of Sheep                                    | Area on Straw (m <sup>2</sup> /ewe) |
|--|-------------------------------------|
| Large Ewe 60-90kg in-lamb                        | 1.2 - 1.4                           |
| Large Ewe 60-90kg in early lactation             | 1.4 - 1.8                           |
| Large Ewe 60-90kg - with lambs to 6 weeks of age | 2.0 - 2.2                           |
| Small Ewe 45-60kg in-lamb                        | 1.0 - 1.3                           |
| Small Ewe 45-60kg in lactation                   | 1.3 - 1.7                           |
| Small Ewe 45-60kg - with lambs to 6 weeks of age | 1.8 - 2.0                           |

### Trough Space

|                      | Concentrates (mm/ewe) | Restricted Forage (mm/ewe) | Ad-lib Forage & TMR* (mm/ewe) |
|----------------------|-----------------------|----------------------------|-------------------------------|
| Large Ewes (70-90kg) | 500                   | 250                        | 150                           |
| Small Ewe (50-70kg)  | 450                   | 200                        | 150                           |

Winter shorn ewes can have a 10% reduction in lying area but there should be no reduction in trough space allowed.

Shorn ewes can also eat 10% more feed and this should be factored in when rationing.

### Blocks, Buckets & Licks

These are useful in hill and upland situations where they help improve the nutritional value of low quality grazing. The positioning is important to reduce negative impacts of foraging behaviour.

Care needs to be taken with young sheep as they are less likely to take the supplements. Their position in the ration and the reliance on them should be considered and factored in when calculating diets.

## Lambing to Weaning

### Key Objectives

- High milk yield to support optimal lamb growth, ie 20kg at 8 weeks for lowland lambs
- Maximum contribution from grass and forage
- Supplementary feeding to bridge any gap between requirements and forage supply
- Low rate of mastitis
- Minimise the risk of hypomagnesaemia (grass staggers)

### Actions

- Plan grazing for lactation. Monitor sward height and kg/DM per ha available and supplement accordingly
- Group ewes for feeding by lamb numbers and BCS if practical
- Group young ewes together for preferential feeding where possible
- Consider creep for lambs if grazing quality/quantity is limiting their intake
- Monitor ewe BCS and lamb growth
- Lamb 8-week weight is a KPI of ewe performance

| Key Nutritional Requirements  | Threats  |
|---|--|
| Ration to ME and MP requirements (AFRC 1993), as a minimum by ewe BCS, number of lambs being reared and predicted milk yield. | Inadequate energy and protein leads to rapid loss of ewe BCS and then poor milk yield and small weak lambs that fall short of eight-week target. |
| Good quality forage available at all times, including for lambs when they graze from three to four weeks old.                 | Poor quality forage leads to low intake and higher concentrate use or loss of ewe BCS.   |
| Use sward height and DM estimates to plan grazing and need for supplementary feeding.   | Poor planning can lead to higher use of supplements, or poorer lamb growth and increased ewe BCS loss.   |
| Feed offered at the same times and with no sudden changes in feed type or quality.  | Sudden changes can create poor rumen function, hypomagnesaemia.  |
| Supply adequate water close to the grazing area. A 70kg ewe in peak lactation requires more than 7 litres per day.            | Reduced milk yield, poor lambs growth.   |

Milk yield increases rapidly after lambing, peaking at three to four weeks into lactation. Nutritional requirements double after lambing to meet the demands of milk production, sending the ewe into negative energy balance as her feed intake lags behind her nutritional requirements.



### Key Objectives

- Target bodyweight at weaning, mating and lambing
- Target BCS at lambing, rearing one lamb to weaning from ewe lambs
- Long-term (lifetime) productivity
- Lamb loss target of less than 15% from scanning to weaning

### Actions

- Wean potential breeding ewe lambs by 12 weeks of age
- Weigh at weaning and plan grazing to achieve growth targets
- Provide supplementary feed if necessary to achieve required target weight at mating
- Forage analysis and formulating rations
- Group separately from adults for feeding
- Train to eat from troughs if required
- Monitor intakes against predictions
- Weigh and BCS regularly to ensure on target
- Until lambing, weight is the better indicator in ewe lambs

### Weight and BCS Targets:

|                               | Ewe Lambs<br>(mature weight 70kg) | Lowland Shearlings<br>(mature weight 70kg) | Hill Shearlings<br>(mature weight 50kg) |
|-------------------------------|-----------------------------------|--|---|
| Minimum weight at mating (kg) | 42 (60% of mature weight)         | 56 (80% of mature weight)                  | 40 (80% of mature weight)               |
| Target weight at lambing (kg) | 56 (80% of mature weight)         | 63 (90% of mature weight)                  | 45 (90% of mature weight)               |
| Target BCS at lambing         | 3.0                               | 3.0 - 3.5                                  | 2.5                                     |

| Key Nutritional Requirements  | Threats   |
|---|---|
| Ewe lambs need to grow steadily at 200 to 250g per day from weaning to mating.                                      | Inadequate grass supplies and supplement feeding leading to poor growth and targets not met.                        |
| Adequate energy and protein to sustain steady growth of about 130g per day from post-mating to 6 weeks pre-lambing. | Underfed ewe lambs do not grow adequately, produce small weak lambs and suffer long-term reproductive consequences. |
| Feeding for maintenance and pregnancy only in last 6 weeks of pregnancy.  | Low lamb growth rate. Group and feed separately any twin rearing shearling ewes.                                    |
| In lactation, feed replacements 20% above requirements for a mature ewe with the same litter size.                  | Poor performance for ewes and lambs.  |

Bodyweights at mating and lambing are critical to the survival and well-being of both the replacement ewe and her lambs. It also has a significant impact on her lifetime productivity.

### Soya Max

Soya Max is a very high energy, 17% protein ewe compound with 15% soya. Designed to allow low levels of supplementation to complement forage whilst driving colostrum quality and production. Contains Safmannan, Availa Zinc, Availa Selenium and is fully mineralised.

### Healthy Sheep

Healthy sheep is a high energy, 18% protein ewe compound with a good level of DUP. Healthy sheep contains Safmannan yeast cell wall, Availa Zinc, Availa Selenium and is fully mineralised.

### Ewenique

Ewenique is a reasonable energy, 18% protein ewe compound with adequate levels of starch and sugar. It contains Availa Zinc, Availa Selenium and is fully mineralised.

### Prime Ewe

Prime ewe is an 18% protein ewe compound. This compound is ideally suited to fell ewes carrying single lambs to support body condition.

### All Seasons

All seasons is a 16% protein sheep diet, ideal for replacing sugar beet pulp to supplement ewes during the winter when forage or grazing is limited.



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