



Better Returns
Programme

EBLEX SHEEP BRP MANUAL 12

Improving ewe nutrition for Better Returns



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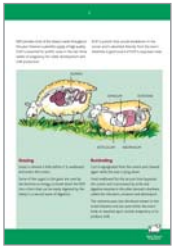


**Better Returns
Programme**

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Contents



2 Fundamentals of sheep feeding



4 Forage

6 Supplementary feeds

8 Minerals, vitamins and trace elements

10 Trough space and water

11 Management tools

12 Topping to mid-pregnancy



14 Late pregnancy to lambing

16 Lactation to weaning

17 Nutrient value of common feeds



The feed requirements of a ewe change throughout her productive cycle. Offering the right amount and type of feed at key times is critical for her health and performance.

Nutritional deficiencies compromise aspects such as fertility and lamb survival. However, making best use of low cost grass and forage, and providing the right supplementary feeds at critical periods, can maximise efficiency and profit.

This booklet explains the fundamental rules of sheep feeding and how management tools such as Body Condition Scoring (BCS) can help producers correctly match the level of feeding to the ewes' needs.

By following the cycle from topping to weaning, it goes on to describe the appropriate feeding regime for each stage.

Feed is the biggest variable cost on a sheep enterprise and is an area where small changes can make a big difference to physical and financial performance. We hope this manual will help producers feed their ewes more efficiently and thereby achieve Better Returns.



D Raine

David Raine

Board Member

EBLEX



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Fundamentals of sheep feeding

Sheep are ruminants and as such have a complex system of digesting and absorbing nutrients.

They have a fundamental requirement for energy and protein, and an adequate supply of a wide range of minerals, vitamins and trace elements.

Energy

Energy is the most important nutrient and is provided by sugar, starch and fibre in the diet. Depending on the stage of production it is important to provide a selection of different types of energy:

- Quickly digested sugars for an instant boost
- Slightly slower digested starch to maintain energy levels over a longer period
- Digestible fibre, a long-lasting energy source that also helps keep the rumen healthy.

Energy is measured in the amount of megajoules (MJ) required per ewe per day. The requirements of ewes vary widely from about 8MJ/head/day for maintenance, to 30MJ/head/day in lactation for a 70kg Mule ewe rearing twins.

For most of the year these requirements can be met by grass alone. Supplementation should only be needed where grass supply or quality is limiting.

Protein

There are two types of protein that can be fed to sheep:

- Rumen degradable protein (RDP)
- Digestible undegradable protein (DUP).

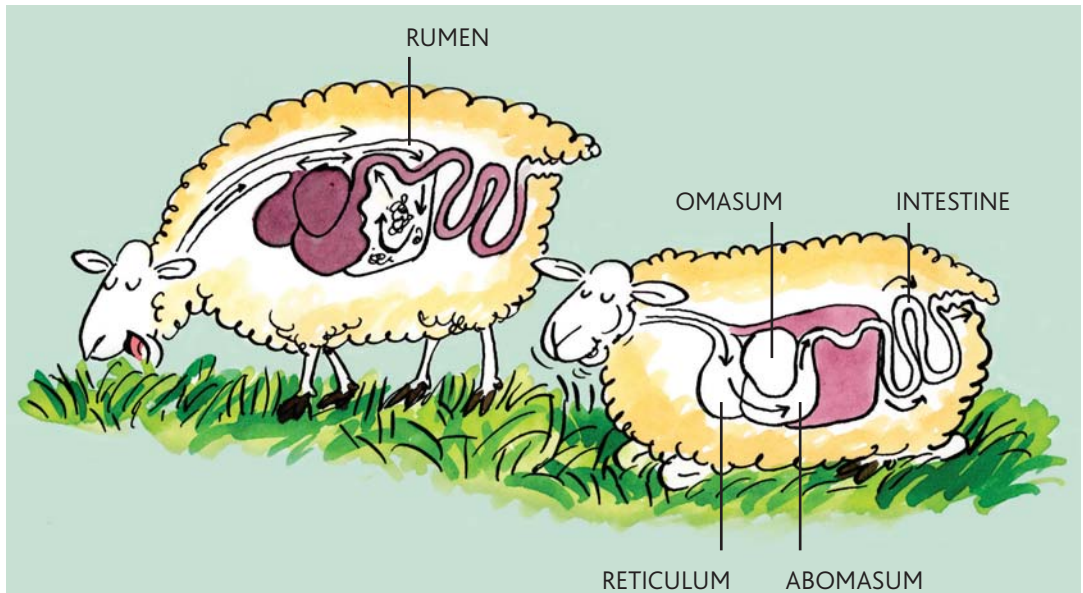
Bacteria in the rumen require a supply of RDP so they can break down the forage in the diet and produce protein in a form that the ewe can digest in the small intestine. Without the intervention of these rumen bacteria, sheep could not utilise the energy locked up in grass and forage.



It is important to provide a balance of energy sources in the diet

RDP provides most of the sheep's needs throughout the year. However a plentiful supply of high quality DUP is essential for prolific ewes in the last three weeks of pregnancy for udder development and milk production.

DUP is protein that avoids breakdown in the rumen and is absorbed directly from the ewe's intestines. A good source of DUP is soya bean meal.



Grazing

Grass is chewed a little before it is swallowed and enters the rumen.

Some of the sugars in the grass are used by the bacteria as energy, to break down the RDP into a form that can be easily digested by the sheep in a second wave of digestion.

Ruminating

Cud is regurgitated from the rumen and chewed again while the ewe is lying down.

Food swallowed for the second time bypasses the rumen and is processed by acids and digestive enzymes in the other stomach chambers, called the reticulum, omasum and abomasum.

The nutrients pass into the blood stream in the small intestine and are used within the ewe's body as required, eg to sustain pregnancy or to produce milk.

Forage

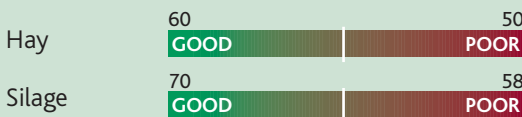
Home produced conserved forage is normally the most economic feed when grass is in short supply or when sheep are housed. However, nutritional quality of hay and silage can vary widely.

Analysis of forage by a reputable laboratory will help ensure the right supplements are provided at the right time to optimise performance.

Understanding forage analysis

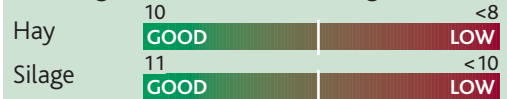
'D' value – A measure of feed digestibility.

The higher the D value the less concentrates are required for ewes pre-lambing.



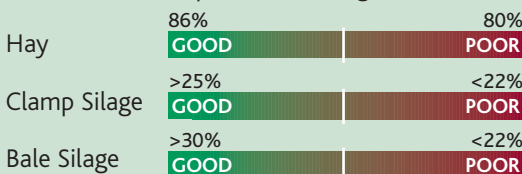
Metabolisable Energy (ME MJ/kg DM).

A measure of the usable energy available to the animal. When buying a supplement make sure the ME is higher than that of the forage.



Dry Matter (DM%) – A measure of what is 'not' water.

If silage is too wet (less than 25% DM), it is difficult for pregnant ewes to eat enough to meet their needs. If this is the case the amount of concentrate required will be higher.



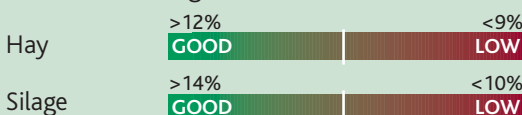
pH – A measure of acidity in silage.

Very acid silage (below pH 4.0) can affect palatability and restrict how much a ewe eats. Higher levels of supplement are required to compensate.



Crude protein (CP%) – A measure of the protein content.

It is important to provide enough protein in supplementary feeds to make up any protein deficit in the forage.



Ash (%) – A measure of mineral and trace element content.

Forage has a natural level of ash, but levels over 10% in silage indicate soil contamination and poor fermentation and should not be fed to sheep.

Ammonia N – A measure of protein breakdown during the ensiling process.

Levels greater than 10% indicate protein breakdown and a poor fermentation.

Total Fermentation Acids – A measure of total acid content.

High levels of acids limit intake. Aim for levels <100 g/kgDM.



Damaged big bales

Do not use big bales of silage that have been left out in the field through the autumn and winter, unless they have been well stacked and protected from damage by birds and vermin.

If the wrap has been damaged so that air can get in and the silage has obviously deteriorated, do not feed to ewes as there will be a high risk of listeria abortion.

Straw feeding

Wheat or barley straw can be used as the main forage for pregnant ewes but some basic principles must be followed:

Ensure that straw is:

- clean and bright
- offered ad-lib at all times, allowing 1.5 kg/ewe/day
- topped up fresh each day in racks or round feeders.

Ewes should be:

- in good condition (lowland ewes Body Condition Score 3) when starting a straw based diet
- moved onto straw (from grass or other forage) no later than seven weeks before lambing
- fed a generous level of concentrates to compensate for the low energy and protein content of the straw.

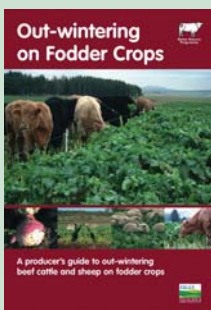
Roots

Roots and forage brassicas such as kale and rape can provide a high energy diet for winter feeding.

But take care to provide:

- 'back up' feeds if grazing conditions become poor
- hay, straw or silage in racks/round feeders, and concentrates at least two weeks before housing, if ewes are to lamb indoors
- supplementary protein if feeding swedes and fodder beet in the last three weeks of pregnancy and early lactation, as these roots are low in protein
- specific mineral supplements, usually with additional iodine
- a grass runback area or dry pad of straw as a lying area.

Do not let ewes become overfat as they may get stuck on their backs or suffer from twin lamb disease.



The EBLEX BRP manual 'Out-wintering on Fodder Crops' has more details on how to manage sheep on a range of roots and forage brassicas.

Email brp@eblex.org.uk or phone **0870 241 8829** for a free copy.

Supplementary feeds

Home mixes

Simple home mixes using cereals, pulses and beet pulp, are economical and have a high feeding value. Cereals can be fed whole but should be rolled when forage is of high quality, to avoid the passage of whole grains through the ewe without them being digested.

Example mixes are shown below highlighting the financial implications of using two different protein sources – ie rapeseed meal or soya bean meal:

kg/tonne	16% protein	16% protein	18% protein	18% protein
Barley/wheat	675	600	625	520
Molassed Sugar Beet Feed	100	100	100	100
Rapeseed Meal	–	250	–	330
Soya bean meal	175	–	225	–
Ewe Mineral (to meet farm requirements)	25	25	25	25
Molasses	25	25	25	25
Cost per tonne*	£180	£167	£188	£171

*Prices assumed to be £145/t for cereals, £170/t for beet pulp, £300/t for soya, £200/t for rapeseed, £350/t for minerals and £170/t for molasses. Costs exclude mixing. These rations have been calculated to provide 12.5MJ/kg ME. Calculate your own mix cost based on current prices.

See Appendix One for the nutritional value of other feed ingredients that could be used.

Compound feeds

Ask your feed supplier for the formulation of their products and carefully choose a supplement based on the:

- nutritional analysis of the hay or silage that will be fed with it
- other feeds available, eg roots
- level of performance of the ewes, eg litter size, liveweight and condition
- system – indoor or outdoor lambing
- feeding facilities – eg troughs or floor feeding.

The compound feed should contain cereals for energy, a cereal or oilseed co-product to supply protein, energy and fibre, soya bean meal or a protected protein to provide high quality protein, and the correct amount of minerals, vitamins and trace elements for optimum performance.

Energy: Aim for 12.5 MJ/kg DM or more.

Protein: The level of protein is important but the source of the protein is more critical. It is important to ensure a good balance of RDP and UDP.

If in doubt about how your compound feed is performing, have a sample analysed and check the results against the nutritional declaration on the bag.



Feeding Levels

Group ewes according to scanning results and Body Condition Score (BCS) for accurate feeding (see page 11).

Thin ewes expecting twins can be fed as if they are expecting triplets. Fat ewes expecting twins can be fed as if they are carrying a single but take care to monitor them carefully.

The table below shows a traditional step feeding plan for concentrates over the last eight weeks pre-lambing. Flat rate feeding is an alternative method that can be very successful and helps to avoid feeding very high levels of concentrates close to lambing.

A 70kg lowland ewe BCS 3

Weeks before lambing	8	6	4	2	1
Silage (11 MJ/kg DM) 18 % CP Compound (kg/day)					
Triplets	0	0.2	0.4	0.6	0.8
Twins	0	0	0.3	0.4	0.6
Singles	0	0	0	0.2	0.2
Hay (9 MJ/kg DM) 18–20% CP Compound (kg/day)					
Triplets	0.3	0.5	0.7	0.9	1.2
Twins	0.2	0.4	0.6	0.8	0.9
Singles	0	0	0.2	0.3	0.5
Straw (5 to 7 MJ/kg DM) 20 % CP Compound (kg/day)					
Twins	0.5	0.7	0.8	0.9	1.1
Singles	0.3	0.4	0.5	0.6	0.7

Remember: do not feed more than 0.5kg of compound per feed

Minerals, vitamins and trace elements

Sheep require several minerals such as calcium and magnesium, as well as vitamins and trace elements in their daily diet to remain healthy and fully productive.

Lack of, excessive amounts, or an imbalance of some of these can cause serious health problems.

Hypocalcaemia



CAUSE

- Calcium deficiency in late pregnancy/early lactation due to sharp increase in calcium requirement
- Older ewes are more susceptible.

PREVENTION

- Minimise stress in the last weeks of pregnancy
- Avoid high levels of magnesium and keep calcium level at about 0.9% in the concentrate feed in late pregnancy.

SIGNS

- Paralysis in the hindquarters
- Partial loss of consciousness.

TREATMENT

- 50 to 80 ml of calcium borogluconate (magnesium hypophosphate and glucose) per day, injected under the skin.

Hypomagnesaemia (Grass Staggers)



CAUSE

- Magnesium deficiency during peak lactation
- Lush heavily fertilised spring grass.

PREVENTION

- Avoid high nitrogen and potash fertilisers on spring grazing
- Feed hay
- Reduce stress in early lactation
- Provide rocksalt and/or magnesium supplements. Include 0.7% magnesium in the concentrate feed, or provide extra magnesium in the mineral or liquid feeds, or add soluble magnesium salts in their water.

SIGNS

- Trembling or inability to walk
- Lying rigid with outstretched legs
- Titanic spasms.

Trace elements and vitamins

Trace elements are needed in very small amounts, but are essential for the maintenance of health. If ewes are not performing as expected and the energy and protein supply is adequate, take blood and/or forage samples to highlight any real deficiencies in trace elements and vitamins before buying expensive treatments.

Vitamin E

Important for immunity and the prevention of white muscle/stiff lamb disease. Improves lamb vigour at birth and growth rates to weaning. Levels are low in conserved forages.

Provide: 100mg/day of vitamin E supplement in concentrate feed in late pregnancy.



Selenium

Boosts immunity and is important for optimum ewe fertility. Important for lamb vigour by helping to mobilise brown fat so reducing the risk of hypothermia.

Availability in pasture is influenced by soil type, eg soils of granite or volcanic origin are deficient.

Provide: 0.5 mg/kg/DM of feed maximum. Selenium has been shown to be very effective in improving lamb vigour and survival. Excess selenium can be toxic.

Cobalt

Important constituent of vitamin B₁₂. Deficiency causes poor growth and wasting in lambs. Also adversely affects ewe fertility.

Many forages are deficient.

Provide: 0.1 mg/kg/DM of feed. Consider supplementation in feed or by bolus, drench or injection of vitamin B₁₂.

Copper

An essential trace element stored in the liver. Deficiency can limit fertility.

Swayback, a spinal problem in lambs, is caused by copper deficiency in ewes during pregnancy. Excess copper is toxic, particularly to vulnerable breeds, eg Texels fed concentrates for prolonged periods.

Provide: Supplementary copper only under the advice of your vet, e.g. copper capsules.

Iodine

Important for control of the ewe's metabolic rate and for foetal development.

Supplements may be needed when feeding kale, rape or other brassicas.

Excess iodine in late pregnancy inhibits a lamb's ability to gain immunity from colostrum.

Provide: A mineral that is tailor-made to suit the farm and system. These can be better value than off-the-shelf products.

Note – milligrams (mg) and international units (iu) are the same.

Trough space

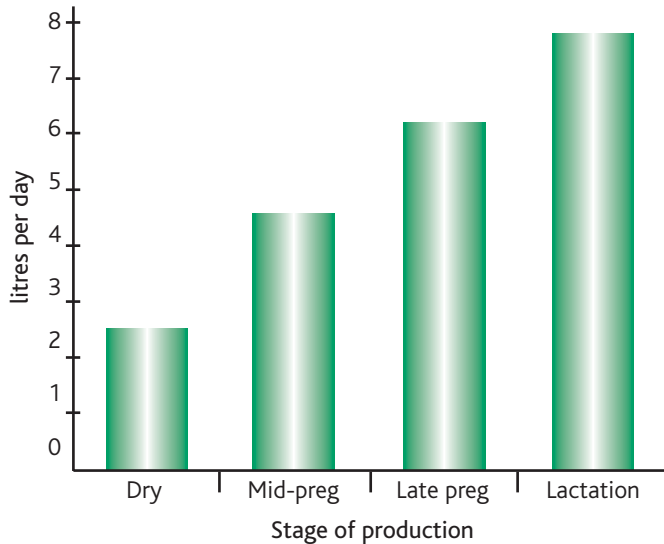


Providing adequate trough space is important to ensure each ewe in a group receives her share. Minimum space requirements are:

- Ad-lib forage 12–15cm/ewe
- Rationed concentrates 45cm/ewe.

Alternatively, compound feed can be scattered on the floor providing the ground or bedding is clean and dry. However, if there is an outbreak of an infectious disease such as enzootic abortion, consider changing to trough feeding.

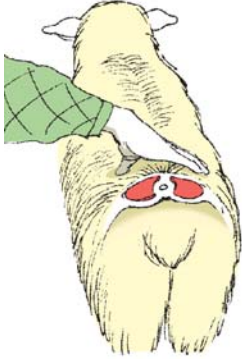
Water



Requirements for water increase significantly in late pregnancy and early lactation. It is essential to provide ad-lib fresh water at all times.

The chart (left) gives a guide to the recommended quantities, although these will vary according to the dry matter of the diet on offer.

Management tools

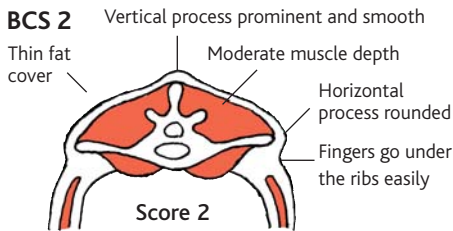


Body Condition Scoring

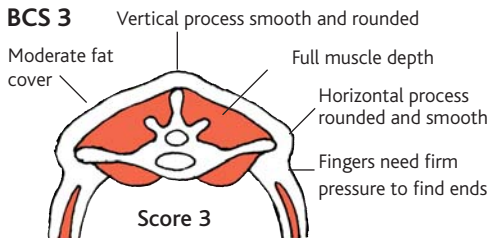
Body Condition Scoring (BCS) is a useful management tool for assessing the adequacy of nutrition through all the stages of the reproductive cycle.

It is measured on a scale of 1 (very thin) to 5 (very fat).

Condition is scored by placing the hand on the back over the last rib and feeling for the sharpness of the bones.



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



The vertical processes are smooth and rounded; the ends of the transverse processes can be felt only with firm pressure. The loin muscle is full and has a moderate covering of fat.

Aim for the following through the year:

	Body Condition Score Targets		
	Hill ewes	Upland ewes	Lowland ewes
At weaning	2	2	2.5
At tupping	2.5	3	3.5
Mid-pregnancy	2	2.5	3
At lambing	2	2.5	3

- Monitor condition regularly and adjust grazing and feed accordingly
- Group ewes by condition score at weaning
- Give the leanest group the best grazing
- Eight weeks on good grazing should raise body condition by one score
- Younger ewes tend to recover body condition faster than older ewes.



Pregnancy scanning

Scanning should take place at between 40 to 90 days of pregnancy. Scanning allows:

- rations to be fed to match ewe needs and avoids wasteful overfeeding
- the optimum use of limited housing
- plans to be made for fostering.

Tupping > early pregnancy > mid-pregnancy

Tupping

Having ewes in the right condition at tupping will greatly reduce the risk of problems during pregnancy and lactation.

Check the Body Condition Score, feet, udder, teeth and general health of all potential breeding ewes just after weaning and again just before tupping.

- Wean at least eight weeks before mating
- Move ewes to good grazing (6–8cm grass height) three weeks before tupping and ensure adequate feed is available at all times
- Aim for BCS 2.5–3.5 (depending on the breed) at mating.

If ewes are in poor condition or grass is in short supply (less than 4cm), provide extra forage and consider feeding 0.25–0.50kg/day of a high energy supplement (ME 12.0 MJ/kg DM) eg blocks (to save time) or whole cereals.

Avoid any sudden dietary change or stressful operations during tupping.

Early pregnancy

For the first three weeks after fertilisation, the egg is not attached to the uterus and is vulnerable to stress, so do not make sudden changes to the diet or undertake any unnecessary handling at this time.

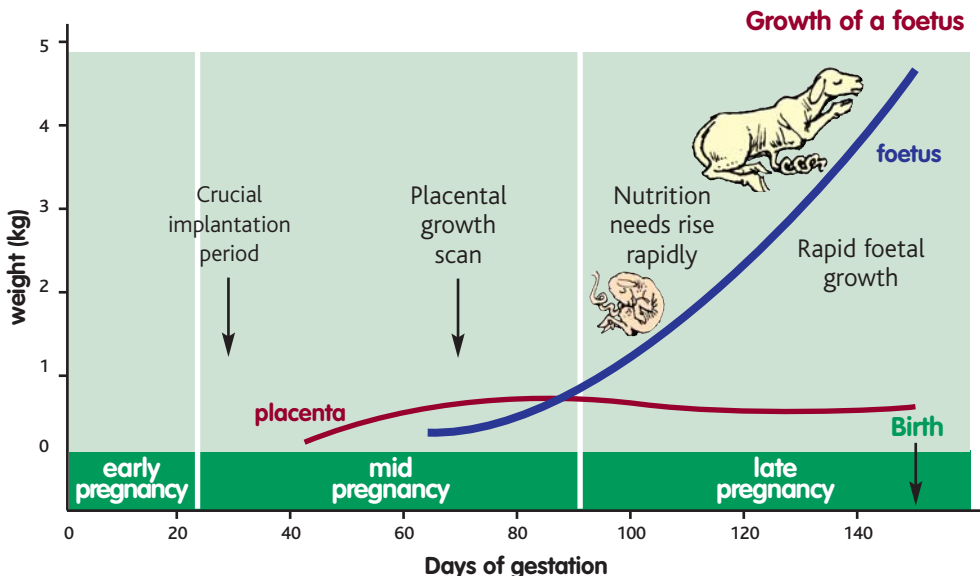
Maintain a level plane of nutrition – including any supplementary feeding for three weeks after the rams have been removed.

Mid-pregnancy

The second and third months of pregnancy are when the placenta develops.

During this period the objective is to ensure maximum placental size, which will lead to good lamb birth weights.

Ewes should not gain or lose more than half a BCS or 5% of bodyweight, during this period.



Don't forget the rams

Prepare rams to ensure they are fertile and physically up to the job of mating the ewes.

One in ten rams can be sub-fertile – which will reduce lambing percentage and draw out the lambing period.

A simple MOT ten weeks before tupping can avoid these problems. Check the four 'T's: tone, testicles, teeth and toes.

Buy new rams in plenty of time to allow acclimatisation to farm conditions.

Sperm production is highly responsive to nutrition and is produced seven weeks in advance, so it is important to minimise nutritional stress during the pre-mating period. Providing supplementary selenium can improve sperm quality.

Aim for BCS 3.5 to 4 for rams at the start of tupping. If BCS is less than 3.5, feed 0.5–0.75 kg/day of a high quality, 18% crude protein ration from ten weeks pre-tupping.

Continue supplementary feeding post tupping until body condition is restored to BCS 3.

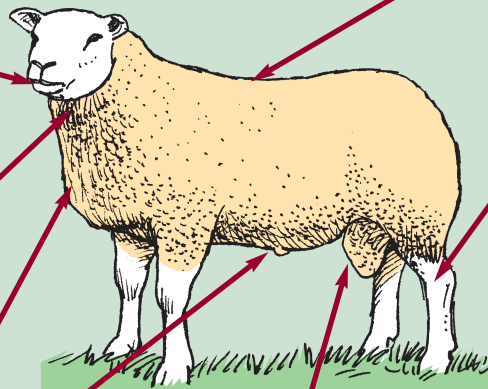
A simple MOT will spot over 90% of problems that reduce ram performance.

- **Teeth and mouth** – check incisor and molar teeth.

- **Neck/head/shoulders** – check for any wounds from fighting or signs of the disease caseous lymphadenitis (CLA).

- **Brisket** – pay attention to sores from raddles.

- **Penis/sheath** – check that sheath is clear of infection with no sign of shearing damage and that penis can be extracted.



- **Testes** – should be firm but springy and a good size. Check for lumps and evenness of size.

- **Body Condition** – rams should be at score 4 (3.5 for hill rams) at tupping so they have body reserves but are not too fat.

- **Legs and feet** – rams need sound feet to work well. Footrot and other infections reduce fertility due to raised body temperatures.



Late pregnancy > lambing

Late pregnancy

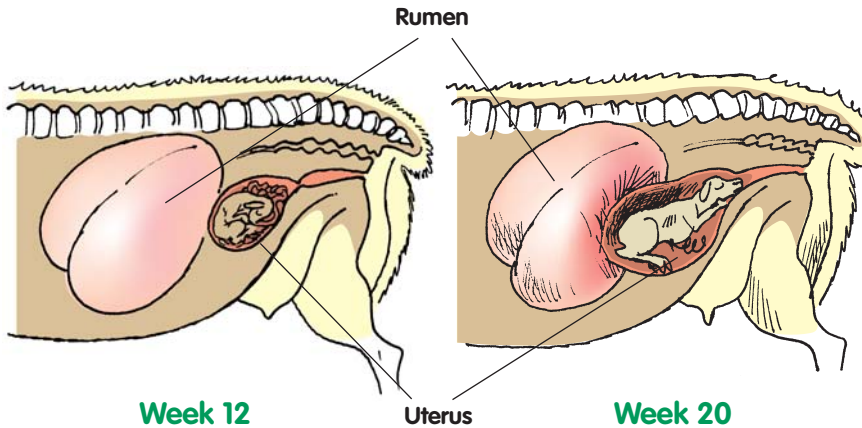
Seventy per cent of foetal growth occurs during the last six weeks of pregnancy. The udder also develops and the feeding regime will influence colostrum quality. Thin, pale fore-milk indicates poor pre-lambing feeding whilst thick, yellow colostrum suggests the ewes have been well-fed.

At this time, the ewe's energy and protein requirements increase rapidly; more than doubling for those carrying twins. However, as the lambs

grow and take up more room inside, ewe appetite reduces by about 30%.

It is therefore important to increase the nutrient density of the ration to keep pace with foetal growth.

Supplementary concentrate feeding should complement the forage offered, and should be gradually increased either by step rate or flat rate feeding (see page 7).



Complete diets/Total Mixed Rations (TMR)

A complete diet or TMR is where the forage and concentrates are mixed together and fed out from a feeder wagon.

TMR is the ideal way to feed ewes, as it provides a constant diet throughout the day, with no large shifts in rumen pH associated with concentrate feeding once or twice a day.

These can be formulated to meet the increasing needs of the pregnant ewe, but the advice of a competent nutritionist is strongly recommended.





Grazing

Well managed grass (4–6cm height) is adequate for ewes in late pregnancy as long as supply is not limiting, and mineral and trace element needs are met via free access minerals or specific supplements/boluses/injections.

This requires careful management of grassland and the resting of pastures for three months or more beforehand, so that ewes can be turned out on to good grazing two to three weeks before lambing.

Reducing the risk of metabolic diseases

The consequences of underfeeding in the last two months of pregnancy can be significant and can give rise to thin ewes, the birth of small, weak lambs, and poor milk yield and quality.

This is a critical time to get nutrition right. Feed imbalances can cause a number of metabolic diseases in ewes.

Twin Lamb Disease (Pregnancy Toxaemia)

Thin or over fat ewes carrying multiple embryos can be at risk due to inadequate levels of available energy.

Ensure:

- all ewes are at optimum body condition
- stress is minimised
- all sheep are getting their share of concentrates. Young ewes and shy feeders may need to be kept in a separate group.

If the disease is diagnosed, review the feeding system and treat affected ewes with oral propylene glycol at 50–100ml per day and 50–80ml of calcium borogluconate (magnesium hypophosphate and glucose) per day, under the skin.

Acidosis

Acidosis is where there is a marked decrease in rumen pH due to feeding:

- high levels of concentrate in one feed or
- inadequate forage or
- too much finely ground cereal.

This causes:

- a decline in fibre digestion
- lower feed intake
- reduced performance.

Never feed more than 0.5kg concentrate per feed, and if feeding cereals avoid over-processing them.

Lactation > weaning

Once ewes have lambed it is important to ensure that all lambs receive adequate colostrum, ideally within two hours of birth, to provide immunity against disease.



Lambs need 50ml of colostrum per kg body weight in the first six hours of life. A 4kg lamb needs almost 1litre in the first 24 hours.

- Remember, when feeding lush spring grass there is a high risk of staggers, so provide supplementary magnesium (see page 8).

Weaning

Lambs should be weaned at 12–16 weeks of age to give the ewes ten weeks recovery time before mating.

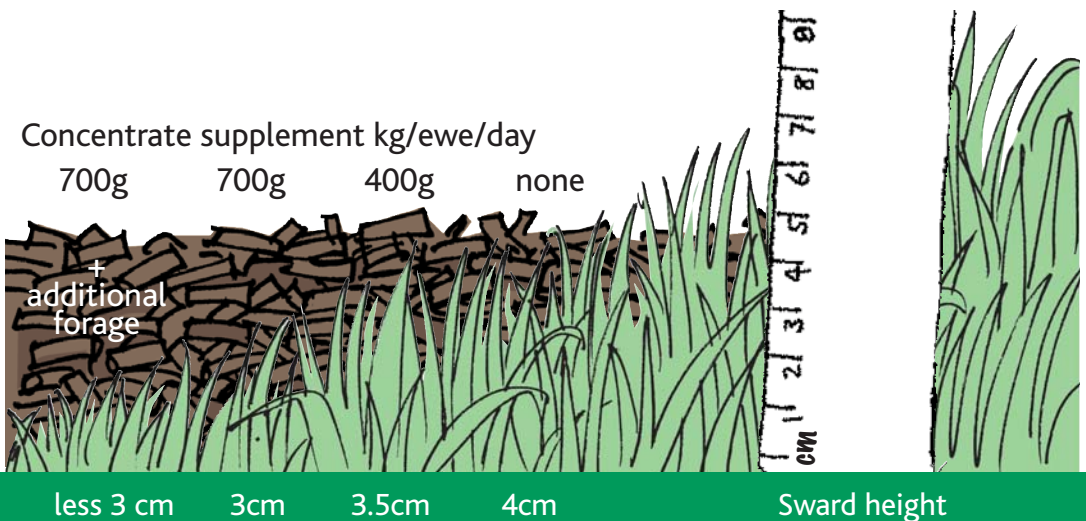


Weaned lambs should be turned onto pasture known to have a low infestation of worms, with a sward height of 6–7cm, to maximise lamb liveweight gain.

Good quality grass, produced by well planned grazing management, can avoid the need for creep feeding.

A recently lambed ewe producing enough milk for two strong lambs is often under severe nutritional stress, so correct feeding is vital.

- Ewe feed intake increases by around 50% after lambing
- Maintain pre-lambing diet if ewes are housed for at least 24 hours, but increase the allocation of concentrates if housed for more than two or three days.
- Peak milk yield is reached three to four weeks post lambing
- If grazing, feed a good quality, high protein concentrate at a rate of 0.5 kg per lamb reared, until the grass is over 4cm high.



Appendix 1

Nutrient Value of Commonly Used Feeds

Feed Ingredient	Dry Matter (%)	Energy ME (MJ/kg DM)	Protein (% in DM)	DUP (% of protein in DM)
Forages (average)				
Grass Silage clamp	25	10.8	16.0	3.0
Grass Silage baled	35	10.0	12.0	3.0
Hay	85	8.8	9.0	2.3
Wheat Straw	85	5.0	4.0	0.7
Roots				
Fodder Beet	18	11.9	6.3	0.7
Kale	14	12.0	17.0	2.1
Stubble Turnips	8	12.0	11.2	1.2
Swedes	11	13.0	9.0	1.2
Cereals and Legumes				
Wheat	86	13.5	13.0	1.5
Barley	86	13.2	12.5	1.4
Oats	86	12.0	11.0	0.8
Beans	85	13.0	30.0	4.2
Peas	87	13.5	25.2	3.2
Cereal By-Products				
Wheatfeed	88	11.5	18.8	4.3
Maize Gluten	88	12.0	20.7	2.2
Oilseed By-Products				
Soya Bean Meal (Hypro)	89	13.5	53.8	12.3
Rapeseed Meal	89	12.0	40.0	5.5
Sunflower Meal	89	9.5	33.6	4.9
Sugar By-Products				
Molasses (Cane)	75	12.5	6.0	0.6
Molassed Sugar Beet Feed	88	12.5	11.1	2.5
Compound Feed				
Good Quality	86	12.8	21.0	5.2
Poor Quality	86	11.0	18.6	2.9

Note: Figures for protein are quoted in dry matter terms. If needing 'as fed' figures multiply the protein % in the DM, by DM and divide by 100, e.g. **Stubble turnips:** (11.2×8) divided by 100 = 0.9% as fed. **Good Quality Compound:** (21×86) divided by 100 = 18% as fed. **Good Grass Silage clamp:** (16×25) divided by 100 = 4% as fed.



This is one of a number of booklets produced under the Better Returns Programme.

Other titles in the series include:

1. Target Lamb Selection for Better Returns
2. Target Ram Selection for Better Returns
3. Target Lamb Management for Better Returns
4. Target Ewe Management for Better Returns
5. Target Store Lambs for Better Returns
6. Target Easier Management for Better Returns
7. Target Lameness for Better Returns
8. Target Worm Control for Better Returns
9. Improving ewe breeding for Better Returns
10. Controlling external parasites for Better Returns
11. Target ewe fertility for Better Returns

All contain useful pointers to where you can achieve savings in time and money as well as increase the value achieved from your sheep enterprise.

Copies are available FREE from EBLEX, call 0870 241 8829 or email brp@eblex.org.uk

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 Programme**