

Practical Sheep Nutrition



About HCC

Hybu Cig Cymru/Meat Promotion Wales (HCC) is the strategic body for the promotion and development of red meat in Wales and the development of the Welsh red meat industry. Its mission is to develop profitable and sustainable markets for Welsh lamb, Welsh beef and pork for the benefit of all stakeholders in the supply chain.

HCC's five strategic goals are:

- Effective promotion of Welsh Lamb and Welsh Beef and red meat products in Wales
- Build strong differentiated products
- Improve quality and cost-effectiveness of primary production
- Strengthen the red meat supply chain
- Effective communication of HCC activities and industry issues

This booklet forms part of a series of publications produced by HCC's Industry Development team.

The Industry Development team deal with a range of issues that include:

- Technology Transfer
- Research and Development
- Market Intelligence
- Training
- Demonstration farms
- Benchmarking

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1. Introduction

Proper nutrition is central to the welfare, health and productivity of all animals. Feeding is more than providing for the animal's immediate needs. It also affects future production because inadequate feeding during key periods of embryonic, foetal and early postnatal growth influence subsequent performance. Also effective planning of diets to provide the correct levels of nutrients can reduce overall feed costs.

Sheep are ruminant animals and rely on a mutually beneficial relationship with bacteria, protozoa and fungi in their rumen to help them digest the fibrous foods they consume. So diets need to be formulated with the idea of feeding the rumen to feed the sheep (see technical note 1). Nutrients are needed for body maintenance, physical activity, growth, milk production, reproduction and health. All of the nutrient needs must ultimately be met from the diet, although some mobilisation of body tissues can provide some nutrients and energy over short periods, e.g., in early lactation.

In this booklet, we have compiled a practical guide to the nutritional principles and practical feeding of sheep throughout the year.

This is all underpinned by specific technical notes, which can be found at the back of the booklet.



2. Basic diet formulation

Generally sheep will be at grass for most of the year, however during winter or at lambing they may be housed or given extra feed at grass. It is important to get the nutrition right to prevent loss of body condition or problems at lambing.

Home-grown forage, such as hay or silage, is relatively inexpensive and can be used during periods when grass is of low quantity or quality, or when grassland needs to be protected from poaching. Sheep will need to be supplemented during late pregnancy, early lactation or during rapid growth to ensure requirements are met.

General points

- The higher the forage quality, the higher the feed intake. E.g. the intake of high quality hay is six-times higher than the intake of barley straw.
- As supplementation with concentrates increases, the intake of forage is likely to decrease.
- Feed costs will be lower if the concentrates are reduced to ensure high intake of forage, as long as the nutritional requirements are being met.
- Allow the animals to select the more nutritious leafy fraction of their forage to increase the intake. This is important for low quality roughages, such as barley straw, in which the leaf blade has double the nutritive value of the stem.
- Ensure adequate feed space if feeding restricted quantities of feed to ensure all animals can feed, e.g. suggested trough space allowance are 300 mm for hill ewes and 450 mm for lowland ewes.



3. Feeding rams

Ensuring the rams are in optimum condition before tupping is crucial for their short- and long-term performance.

3.1. Preparation for tupping

- The target body condition score (BCS) (see technical note 2) for rams at the start of tupping is 3.5.
- Testes size and sperm production are highly responsive to nutrition.
- It takes 7 weeks to produce sperm, so there needs to be an improvement in the ram's nutrition for at least 7 weeks pre tupping to cause an increase in sperm numbers.
- Trace minerals, especially zinc and selenium, play important roles in sperm quality.
- Rams need flushing too (see section 4.1)

Action: From at least 2 months before tugging, rams with free access to good quality grass should be given a small amount (~0.2 kg per head per day) of 18% crude protein concentrate diet (see table 1-P8). If rams are thin (less than BCS 2.5) then they should receive 0.5-1.0 kg per head per day of concentrates (see table 4-p8).

General points

- If grass quality and quantity is very good, the concentrate supplement should only be used to correct any nutritional deficiencies.
- High amounts of concentrate are only needed if grass quality is poor and rams are failing to achieve their 3.5 target condition score

3.2. During the mating period

Continuing to supplement their feed during the mating period has two benefits:

- It helps to maintain ram condition. If they lose too much condition they are less likely to perform consistently through tugging
- Training rams to come to a bucket allows raddle adjustments and colour changes to be made without having to gather the flock.

3.3 After mating

- Rams require supplementary feed to regain lost body condition (up to BCS 3) for overwintering.

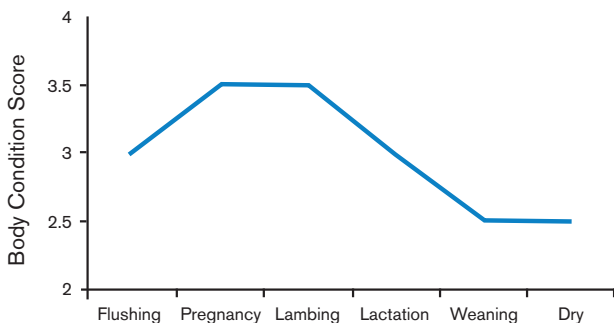


- Suitable diets are ad libitum hay with 500 g per head per day of a 16% crude protein coarse mix concentrate until condition is regained (see table 1-p6).
- Young growing rams (ram lambs completing their first mating season) have an additional feed requirement to maintain growth over the winter period and following spring.
- Ram lambs, even if they haven't been used for breeding yet, need to be fed to exploit their increase in appetite so they can reach their full size.

4. Feeding ewes

For maximum lamb production, body condition score at mating should be 3.5 with as little deviation as possible from this score (figure 1).

Figure 1: Body condition targets for optimum sheep reproduction



Note that thin ewes require 65 days to recover 1.5 units of body condition on good grass while overfat ewes – BCS >4 – should be restricted to avoid lower litter sizes. Aim for a flock with uniform body condition score at mating.

4.1 Flushing

Improving the nutrition of the flock (flushing) aims to increase the ovulation rate of the ewes to improve the litter size. There should be no loss of weight or condition. If extra lambs are not wanted, the ewes should be kept on continuous good feed.

Sheep should be moved to good grazing (sward height > 6cm) three weeks before tupping. If sward height is < 4 cm then concentrates should be given.

4.2 Early pregnancy - the first month

This is a time to avoid nutritional extremes, which may affect early embryo development. Ensure careful handling to increase embryo survival.

4.3 Mid-pregnancy – the second and third month

The nutrition during mid-pregnancy depends on their body condition at mating (see table 1).

Body condition at mating	Problem	Action
2 = Poor	Undernutrition can affect foetal development and birth weight	No further loss of body condition. High plane of nutrition = good quality forage/grass or some concentrates (200 g per day)
3 = Correct	Maintain condition to ensure no effects on the foetus	No more than 0.75 units of condition should be lost. Medium plane of nutrition = medium quality forage/grass
4 = Fat	Increased susceptibility to pregnancy toxæmia if subjected to sudden restriction in feed in late pregnancy	Reduce body condition by 0.5 – 0.75 units. Low plane of nutrition = restricted medium quality forage/grass

Table 1: The problems and actions for ewes at different body condition scores at mating

Body condition at mating	Metabolisable Energy (MJ ME/kg DM)	Crude Protein (g per day)
2 = Poor	11	115
3 = Correct	9	85
4 = Fat	7	70

Table 2: Daily energy and protein allowance for 60 kg ewes at different body condition scores at mating



Table 1 shows the action that should be taken to ensure ewes are at the correct body condition score, while table 2 indicates how the daily allowances should be altered to achieve the body condition targets.

Note: Aim for all the flock to be around condition score 3 by adjusting feeding levels. Pregnancy scanning (at about 70 days) is a good time to check BCS. Ewes should be separated into feeding groups based on both their BCS and litter size to allow for accurate and cost-effective rationing.

4.4 Late pregnancy – the last 6 weeks

70% of the foetal growth occurs in the last 6 weeks of pregnancy, so to prevent excessive use of the ewe's own tissues the diet needs to provide all the nutrients she needs (see technical note 2). Also if feed requirements are met, it will help to prevent other problems such as hypocalcaemia and pregnancy toxaemia (twin lamb) (see technical note 3).

As well as maintaining herself, the ewes needs nutrients for:

- maintaining and growing the unborn lamb(s)
- developing the udder
- producing colostrum (50 g per kg lamb birth weight)

This means that poor nutrition during this period will affect birth weight and the ewe's milk yield, and overall the lambs' viability.

Note: The ewe's appetite will drop by 30% in the last 6 weeks of pregnancy. This means ewes should be offered high quality supplements to meet their nutrient requirements.

Concentrate supplementation in late pregnancy

Concentrates are an important source of nutrients during the rapid foetal growth period, and serve as a carrier for essential minerals and vitamins such as selenium, cobalt and vitamin E (see technical note 4). The amount of supplementation will depend on the forage quality and quantity, the amount of time before lambing and the number of lambs. See table 4 for some concentrate options.

No. of lambs expected	Weeks prior to lambing			
	6-8 weeks	4-6 weeks	2-4 weeks	0-2 weeks
1	-	-	-	300g
2	-	200g	300g	600g
3	-	200g	500g	900g

Table 3: Concentrates requirements (grams per day) for crossbred ewe offered good quality precision chop silage* and the effects of the number of lambs expected.

* = 10.8 MJ per kg DM of Metabolisable Energy and 14% Crude Protein

Note: Concentrates should start 2 weeks earlier and be 200 grams per day higher than the figures in table 3, if the ewes are in poor condition, the forage is of different quality or it is not precision chopped.



Note: If the concentrate intakes are higher than 400 grams per day, the feed should be equally split into two feeds.

An alternative to the step-wise system, seen in table 3 (p7), is to feed at a flat rate of 400 grams per day for the last 6-8 weeks of pregnancy. This means there is an over-supply of energy and protein at the introduction of the concentrates, but this compensates for an under-supply during the last couple of weeks. It also prevents a high intake of concentrates in the last 2 weeks, which may cause acidosis (see technical note 5), and reduces the risk of metabolic disorders (e.g. pregnancy toxæmia and calcium deficiency) (see technical note 3), that are triggered by sudden nutrient deficits.

Meet the rapidly increasing requirements for energy and protein during late pregnancy to ensure lamb viability. If ewes are grouped by body condition, lambing date and number of lambs it allows for efficient and cost-effective feeding.



Table 4: Options for concentrates

Feedstuffs	Diet options/Concentrates (kg per tonne)			
	1*	2*	3	4
Whole barley	825	820	275	400
Whole maize	-	-	250	250
Maize gluten	-	-	200	-
Soya Bean meal	150	135	200	125
Rapeseed meal	-	-	-	100
Protected soya	-	-	-	50
Molasses	-	-	50	50
Fish oil	-	20	-	-
Min/Vit supplement ⁽¹⁾	25	25	25	25
Crude protein content	14%	16%	21%	21%
Energy content (MJ/kg DM)	12.5	12.4	12.8	12.8

*Some of whole barley can be substituted with oats, maize or sugar beet pulp.

(1) Min/vit supplement should have no added magnesium to reduce the risk of urinary calculi.

Feed blocks

The use of feed blocks can improve the performance of hill or upland ewes in terms of maintaining liveweight, which would have knock-on positive effects on fertility, lambing percentage, lamb survival and liveweight gain of the lambs reared.

Feed blocks are convenient, palatable source of energy and minerals, and are labour saving as they reduce the need for trough feeding. They should be used when the availability of either grazing or home-grown forage is restricted, or if trying to boost nutrition around flushing, tupping and lambing.

Care needs to be taken in the ingredients as there is a wide variation in composition, and they can expensive forms of energy or protein compared to some concentrates.

4.5 Early Lactation

In the first six weeks after lambing, the lamb's growth mainly depends on the amount of milk obtained. This is affected by its mother's milk yield, the number of lambs she is suckling and the lamb's ability to obtain its share. Although the ewe's appetite increases rapidly after lambing the high-energy demands for milk production means that twin and triplet-suckling ewes have to mobilise body fat ("milking off her back"). The energy requirement of an ewe with twins will increase by 70% between late pregnancy and early lactation.

General points

- Using body fat results in a higher demand for high quality dietary protein, so concentrates should contain up to 20% rumen undegradable protein, e.g. rumen protected soya.
- It is better to supplement the forage intake of lactating ewes with a smaller quantity of a high protein concentrate than a larger quantity of a low protein concentrate.
- Correct feeding avoids the risk of the ewe losing condition and reduced milk production.



High quality forages are required to maximise milk production. It is important not to overfeed concentrates, as this can suppress intake of forage and increase costs. So if the forage or grass is providing enough energy, supplementation should be considered to ensure adequate levels of protein only.

Weight of ewe (kg)	Concentrate supplementation when using ad lib forage during early lactation (kg)
45	0.6 – 0.8
60	0.8 – 1.0
80	1.0 – 1.2

Table 5: The guideline level for concentrate supplementation of ad lib forage (ME = 10.5 MJ/kg DM) during early lactation.

Note: Continue feeding concentrates for three to four weeks after lambing. Then, if on good quality forage or grass, slowly reduce the level of supplementation and discontinue after six weeks.

Protein and energy requirements should be met to ensure that loss of condition is not too severe and milk production is maximised. The ewes should not lose more than 0.5 units of condition.

4.6 Post weaning

Once the lambs have been taken off the sheep, the sheep should be grazed on permanent pasture to allow them to gain condition (optimum condition score 3 – 3.5) and to prepare for the next season.

Action: Monitor condition of flock, and aim for sheep with uniform condition. Adjust access to pasture or stocking density accordingly.



5. Feeding Lambs

For the first four weeks of age, lamb growth is virtually 100% dependent on the ewe's milk production. A key component of milk's role is its provision of high quality protein that bypasses the rumen.

Lowland cross-bred lambs grazing alongside their mothers require that protein until they are around 35 kg liveweight. It is only thereafter that pasture provides enough protein in relation to energy to meet the growing lambs needs. So it is important to maintain the ewe's nutrition so she can meet this requirement.

5.1 Creep feeding

The purpose of creep feeding is to boost the suckling lamb's nutrient intake.

Reasons include:

- grass supplies are limited and to try and maintain growth rates;
- to ensure lambs achieve market weight and condition before a likely fall in selling price;
- to reduce the risk of gastro-intestinal parasite infections;
- to allow increased stocking density;

General points

- If there is a plentiful supply of good grass available (sward height >5cm), creep feeding will not improve performance but will add to costs.
- Forward creep grazing, where lambs are given access to the best grazing before the ewes, can be used to prevent the need for creep feeding.
- On restricted grazing, lambs with limited creep feeding will gain on average an extra 1 kg liveweight for every 5-6 kg of creep feed compared to unsupplemented lambs.
- Lambs with ad lib access can reach intakes of over 1 kg per head per day.
- A home-mixed ration based on whole barley + 15% soya bean meal is suitable (ME = 12.5 MJ/kg DM).
- For long-term feeding a mineral suitable for lambs (no phosphorus, magnesium or copper added) should be included at a rate of 2.5%.

Note: If introducing creep to older lambs this must be done very carefully to avoid gorging and acidosis. Allow only small amounts to start and gradually increase. The creeper design should be designed to:

- Ensure easy access for lambs but not ewes.
- Ensure the area is sheltered and on dry standing to prevent poaching.
- Ensure the area is kept clean to prevent disease build-up, e.g. coccidiosis. If poaching has occurred, e.g. around troughs and water tanks, apply lime to the area to minimise coccidiosis.
- Ensure the lambs are presented with clean and fresh feed. The troughs should be cleaned out regularly.

Action: Grazing management can prevent the need for creep feeding. Creep feeding may only be cost-effective if the high price Easter market is targeted or the grass is limited (less than 3.5 cm). Design the location of the creep to prevent poaching and disease build-up.

5.2 Post-weaning

For grassland-produced lambs, plan to wean at 12 to 16 weeks of age as there is no benefit from leaving weaning beyond 16 weeks, unless the lambs are close to finishing. Ensure there is good quality pasture (sward height 6-8cm) with a low worm challenge available. Weigh lambs and sort lambs into at least three groups according to weight, and mark a proportion of each group for re-weighing every two weeks to monitor progress.

Action: Aim to finish 80-90% of lambs off grass, and designate the lambs below target weight for sale, or short, medium or long keep finishing.


The short-keep store lamb

The short keep store lamb should be 5-7 kg from slaughter weight. They should reach marketable weight in 5-7 weeks (from September or October) by using good quality grass and minimal concentrates.

Action: Manage their feed to ensure 1 kg of liveweight gain per week

The medium-keep store lamb

The medium keep store lamb should be 7-12 kg from slaughter weight. They should reach marketable weight in 10-18 weeks (from November to early February) by using forage and minimal concentrates.



Fodder crops (e.g. rape, kale or stubble turnips) or arable by-products (e.g sugar beet tops) can be used to finish lambs. Ensure maximum utilisation using temporary fencing.

Action: Manage their feed to ensure 0.7 kg of liveweight gain per week.

The long-keep store lamb

The long-keep store lamb should be 10-18 kg from slaughter weight. They should reach marketable weight in 14-26 weeks (from February to April) by using forage and minimal concentrates.

Fodder crops (e.g. rape, kale or stubble turnips) or arable by-products (e.g sugar beet tops) can be used to finish lambs. Ensure maximum utilisation using temporary fencing.


Action: Manage their feed to ensure 0.5 - 0.7 kg of liveweight gain per week.

For fodder crops or arable by products

- The lambs will need to be introduced gradually (over 10 days) onto the forage or roots to prevent digestive upsets.
- The lambs should be dagged before entering the cropping area to minimise the build up of mud and faeces.
- The condition of the lambs' feet should be monitored to prevent the build-up of mud in the cleats that causes lameness.
- They should be provided with an adequate area to run back on to, either permanent pasture or a strawed area.
- Shelter and fresh clean water should be available

Supplementation will be needed for lambs on forage or roots and should be introduced gradually. The key factors are:

- Roots, e.g. fodder beet, are low in dry matter but high in energy. The supplement needs to be high in protein (~18%) e.g. soya or maize gluten. Provision – 150g – 500g per head per day.
- Fodder, e.g. kale or rape, is high in protein, so the supplement needs to be high in energy, e.g. whole cereals or sugar beet feed. Provision – 225-500g per head per day.



Note: If finishing lambs indoor, care is needed to avoid acidosis (see technical note 5) when introducing older lambs to concentrates. Diet introduction should be gradual, allowing 10 days to achieve ad lib feeding. Once lambs are eating to appetite, feed hoppers should never be allowed to become empty otherwise animals will overeat when the hoppers are refilled causing acidosis.

6. Conclusion

Time and advice is needed for planning feed availability for sheep throughout the year. The emphasis should be placed on maximising the rumen ability by feeding the animal appropriately. This booklet gives practical advice on how to feed rams, ewes and lambs at certain times of the year to boost their performance. As illustrated by the ewe if you get the body condition score right at mating, she is likely to have fewer problems during pregnancy and lactation, and it will also benefit her for the next season.

Efficient pasture management and use of resources, such as home-grown forage, can increase the profitability and productivity of the unit, as the concentrate costs can be reduced while ensuring all requirements are met.

7. Technical notes

1. The Rumen

The rumen is a fermentation chamber where feed and microflora (bacteria, protozoa and fungi) interact to produce various compounds that provide energy and protein to the sheep and the microflora. The microflora are essential as they produce the enzymes necessary to break down cellulose (found in fibrous plant material) as sheep do not have this digestive ability. The products from the digestion by the rumen microflora are used by the sheep to meet their own energy and protein needs.

Carbohydrates, such as fibre, starch and sugars, are mainly broken down into volatile fatty acids (VFAs); mainly acetate, propionate and butyrate. These are absorbed across the rumen wall to provide energy for the animal.

Protein comes in two forms, and depends on whether it can be degraded by the microflora in the rumen.

Feed Intake

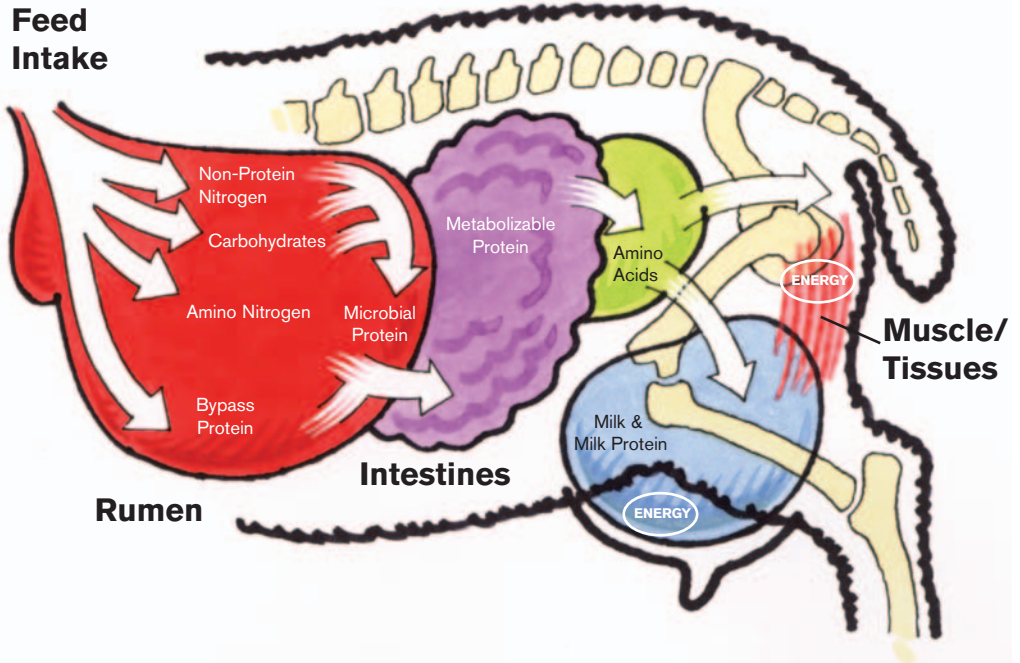


Figure 2. The basic processes within a rumen

Degradable protein is broken down by the microflora into amino acids, which are used by the microflora themselves for growth and reproduction. However when the microflora die they leave the rumen and can be digested and absorbed in the stomach and small intestine of the sheep to meet their requirements for amino acids, which are the building blocks of muscle and milk protein. So the animal benefits indirectly from rumen degradable protein.

Rumen undegradable protein can be used directly as it goes into the small intestine where it is digested and absorbed by the animal's own digestive enzymes. (Note: For animals at a relatively high productivity level young rapidly growing animals or during early lactation), the supply of undegradable protein supplied in the ration may need to be higher than that normally supplied by common forages and cereal based concentrates to ensure requirements are met.

2. How to condition score ewes

Body condition is assessed by handling the ewe over and round the back bone, in the area of the loin behind the last rib.

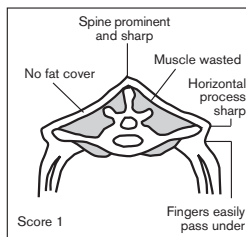


Using the finger tips, first feel the degree of sharpness or roundness of the lumbar vertebrae. Secondly, feel and assess the prominence and degree of cover over the horizontal processes. Then assess by feel the amount of muscle and fat under the ends of these bones. Finally, assess the eye muscle and its fat cover, by pressing the fingers into the area between the vertical and horizontal processes.

Taking these assessments into account, it is usual to score all ewes on a scale of 0-5, using half scores as intermediate points along the scale.

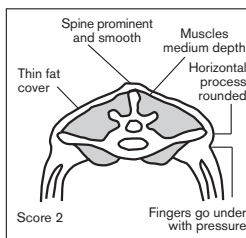
Score 0

This is seldom used as it only applies to ewes which are extremely emaciated and on the point of death. It is not possible to feel any muscle or fatty tissue between skin and bone.



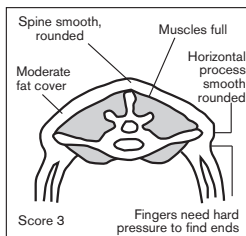
Score 1

The vertical and horizontal processes are prominent and sharp. The fingers can be pushed easily below the horizontals and each process can be felt. The loin muscle is thin and with no fat cover.



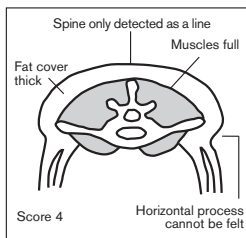
Score 2

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 the fingers under. The loin muscle is of moderate depth but with little fat cover.



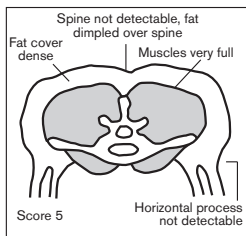
Score 3

The vertical processes are smooth and rounded; the bone is only felt with pressure. The horizontal processes are also smooth and well covered; hard pressure with the fingers is needed to find the ends. The loin muscle is full, with a moderate fat cover.



Score 4

The vertical processes are only detectable as a line; the ends of the horizontal processes cannot be felt. The loin muscles are full and have a thick covering of fat.



Score 5

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

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3. The demands during pregnancy

Figure 3: The percentage increase in the foetus weight in the last 8 weeks of lambing.

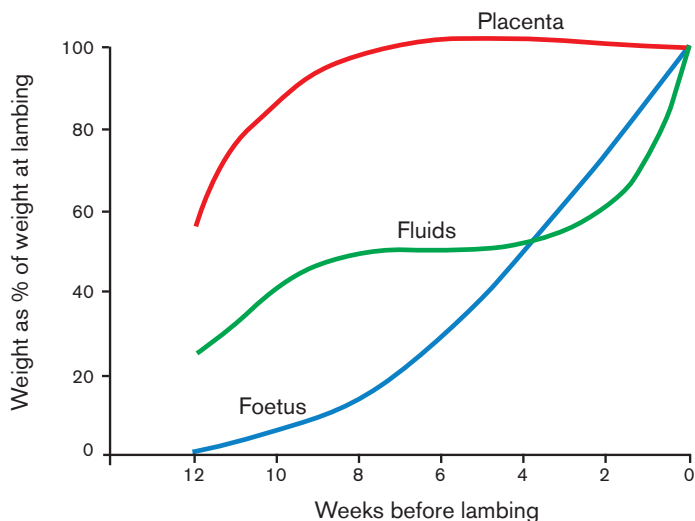


Figure 3 shows the rapid increase in the weight of the foetus during the last few weeks of the pregnancy. This is the main reason for the rapid increase in the requirement for energy and protein for the ewe in late pregnancy

4. Metabolic disorders

Pregnancy toxemia (“twin-lamb”) is a disturbance in the energy levels in late pregnancy in sheep using carrying multiple foetuses, and it may be accompanied by magnesium and calcium deficiency. It is common and can affect any age or breed of ewe and 90% of ewes will die if left untreated. Over-fat or lean ewes are most at risk so it is important to ensure all ewes are in the optimum body condition (3-3.5). The symptoms are weakness, unable to stand and trembling, especially of the facial muscles. She will tend to stand away from the flock and won't eat. Drenching or injecting with glucose (magnesium and calcium too if necessary) can be used to try and reduce the problem.

Magnesium Deficiency (“grass staggers”) is a low level of magnesium in the blood, and generally occurs during the first four to six weeks of lactation (peak lactation) as the already limited reserves of magnesium are reduced further. The onset is very rapid and the first sign of an outbreak may be a dead ewe. The symptoms are that the ewe appears nervous, apprehensive or excited, with trembling, particularly of the facial muscles. Stress (e.g. handling, movement, dogs) can induce magnesium deficiency rapidly. However, it is mostly commonly found in older ewes (in poor condition) with twins on heavily fertilised improved pastures where magnesium levels are low.

Prevention of magnesium deficiency:

- Reduce stress during early lactation
- In the presence of ample grass (>4 cm sward height) there may be a need for supplementary magnesium to prevent a deficiency; using a small amount of concentrate as a carrier or mineral blocks. Care needs to be taken to avoid urinary calculi in male lambs.
- avoiding using high potash fertilizers on pastures to be grazed by lactating ewes
- allowing lactating ewes at grass access to a source of long roughage, such as hay.

Treatment of magnesium deficiency:

- treat affected animal with a solution of magnesium, calcium and some energy immediately
- if possible, remove flock off pasture to prevent further cases. The pasture should not be grazed until measures, such as supplementing with Epsom salts, are taken.

Calcium deficiency often accompanies magnesium deficiency, but can occur from late pregnancy into early lactation. The ewe’s calcium requirements increase rapidly as the foetus grows and colostrum production increases, and the calcium demand is high through lactation. Older ewes are more susceptible as the ability to release calcium from bones reduces with age. The deficiency can be caused by feed change, e.g. change of diet or pasture, feed deprivation, or diets with low levels of vitamin D or protein as calcium absorption can be affected. The symptoms and treatments are similar to magnesium deficiency.

Prevention of calcium deficiency

- root crops and cereals are low in calcium and should be supplemented with minerals or feeds which are high in calcium (e.g. legumes)
- any changes in nutrition should be introduced gradually before and after lambing.

Action: If there have been problems with metabolic disorders, feeding practices need to be reviewed and adjusted as part of the overall Flock Health Plan.

5. Essential vitamins and minerals

Vitamin E is important for immune function and in the prevention of muscular dystrophy in rapidly growing lambs. 100 mg per head per day of vitamin E is now recommended for late pregnant ewes.

Selenium, Cobalt and **Iodine** are important for lamb vigour at birth. Care must be taken not to over-supplement with selenium, cobalt and iodine. Excess selenium is toxic, and ewes receiving too much iodine in late pregnancy produce lambs with a reduced ability to absorb the immunoglobulins from colostrum that are vital for combating disease.

6. Acidosis

The rumen needs to be maintained at pH 6.2 – 6.5 so the microflora can function effectively. When high levels of concentrates are fed, the rapid degradation of starch and sugars can lead to a marked decline in rumen pH as a result of lactic acid production. This low pH, which is usually referred to as rumen acidosis, leads to a decline in microflora activity and numbers. There is a resultant decline in fibre digestion and lower feed intake, which reduces performance. It is important to bear the needs of the rumen microflora in mind as well as the needs of the animal itself.

Further information

For further information on any of the content in this booklet or the work of HCC please contact HCC on tel: 01970 625050, email: enquiries@hccmpw.org.uk or visit www.hccmpw.org.uk.