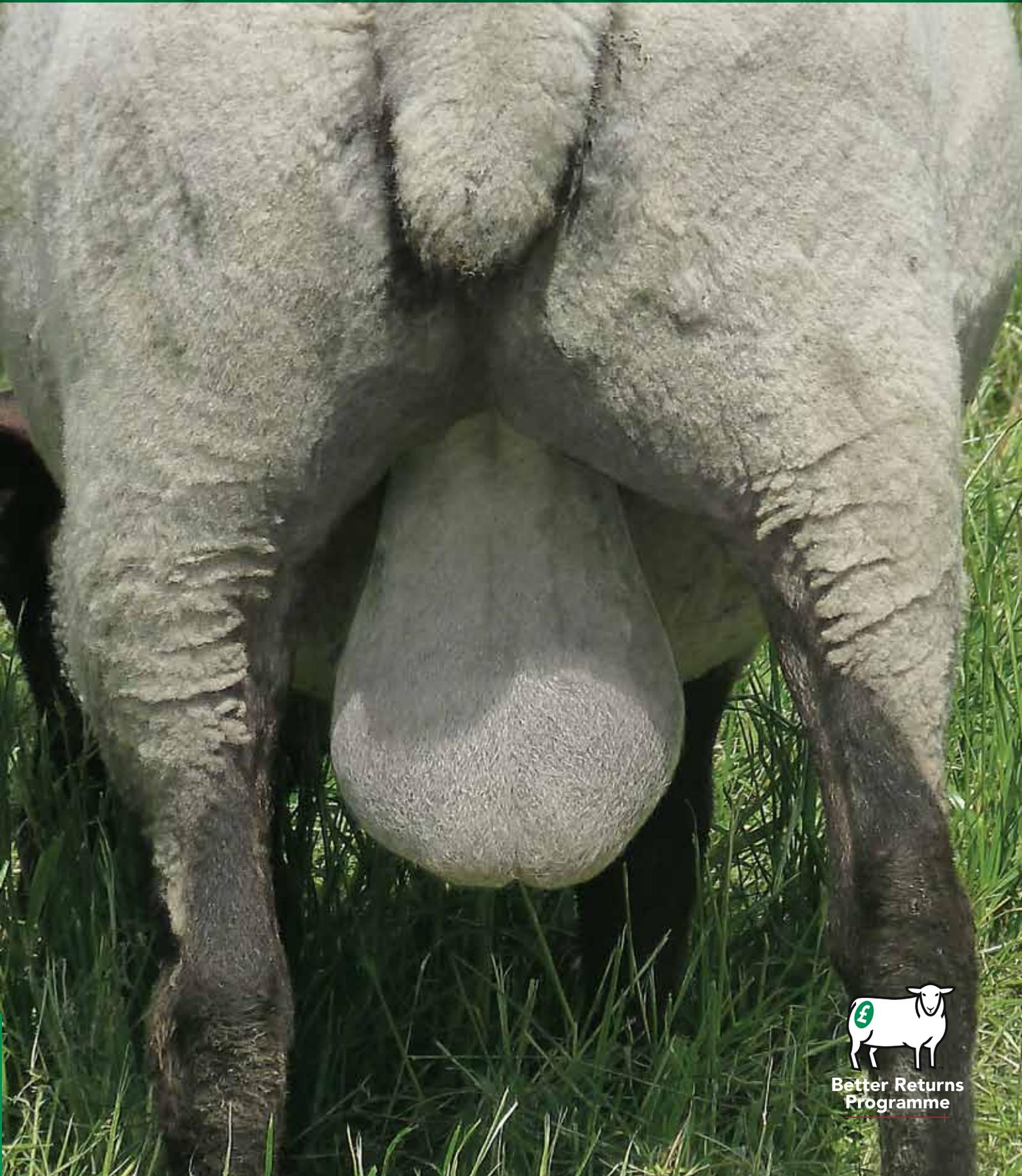


Fit for Purpose Rams

A blueprint for breeders



Better Returns
Programme



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Selling rams is what sheep breeding is all about. However, to ensure future success breeders need to produce rams that producers want to buy again and again.

Less than 5% of recorded rams bred are used by other pedigree flocks, so commercial sheep farmers are by far the biggest target market.

For a commercial buyer rams are costly to purchase and therefore must last at least three or four matings. But too many die or have to be culled after just one or two matings.

To make a financial return on a commercial sheep enterprise, rams must stay alive and mate successfully. They must produce vigorous lambs at birth that survive and go on to express the improved genetics.

Results of ram performance trials suggest around 20% of rams are culled prematurely, with infertility the reason for a third of these, followed by problems with legs and feet.

Over-feeding

There have been concerns for many years that breeding rams are over-fed, and that this may limit their breeding performance. This is a response to strong market signals – buyers prefer the biggest rams. However, it is important to consider the consequences for the animal.

Over-feeding reduces the number of years a ram lives and the number of ewes he mates. It can mask genetic merit for traits such as grazing ability and parasite resistance, and cause long-term welfare issues due to poor joints and kidney problems. For these reasons we encourage breeders and buyers to investigate how rams are reared before purchase.

Essentially over-feeding can make sheep production less efficient, as more cereals are fed and more rams are needed. Rams reared mainly off forage however, are likely to be fitter, more fertile and live for longer.

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Fight the wrong market signals

Buyers at ram sales tend to focus on size – the bigger the better, as this is the only way to estimate growth potential if they do not use Estimated Breeding Values (EBVs) to assist their ram selection.

This gives breeders the wrong market signals, encouraging them to feed heavily to get bigger rams. And so the circle continues. It takes courage to break away.

Graph 1: Effect of weight at scanning on average price at English National Texel Sale.

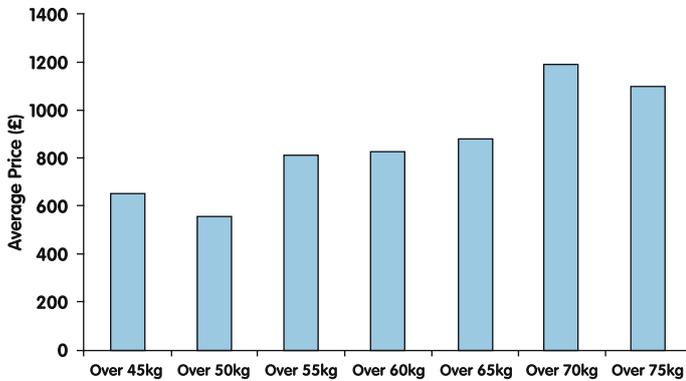


Table 1: Clearance rate of rams at different liveweights

	Catalogue	Sold	Clearance rate %
Over 45kg	5	3	60%
Over 50kg	10	6	60%
Over 55kg	13	10	77%
Over 60kg	28	22	79%
Over 65kg	29	24	83%
Over 70kg	21	19	90%
Over 75kg	12	10	83%

Graph 1 comes from the 2011 English National Texel Sale. It plots weight at around 21 weeks against average price achieved when sold as ram lambs. It shows that generally the higher the weight the higher the price. Also the clearance rate was higher for heavier rams (Table 1).

The challenge is to be brave enough to alter the management system to one that relies more heavily on forage when the market is demanding over-fed rams. But there is a new market emerging for rams that are 'Fit for Purpose'.

This booklet provides a guide to feeding, managing and marketing this type of animal.

The implications of fighting market signals:

- **Better grazing and forage management**
Investment in large-scale re-seeding programmes is not necessary, but good grazing and forage management is essential
- **Cheaper feed costs**
Grass can cost as little as 6p per kg DM compared to 35p per kg DM for concentrates (at £300 per tonne)
- **Different marketing**
Having 'Fit for Purpose' rams is an excellent selling point as there are many benefits to discuss with potential customers. It is worth talking through the effect such rams have on overall ram cost per lamb, compared to an over-fed one (see Appendix 1).

Over-fed rams may last two seasons and mate 40 ewes per year, costing £4.58 per lamb born. A 'Fit for Purpose' ram should be able to tup at least 80 ewes per season and last four years. This reduces ram cost per lamb to around £1.

Do not fall into the trap of thinking less rams will be sold if they last longer, as word-of-mouth recommendation from happy customers will increase interest from other buyers and enhance the seller's reputation.

There is more satisfaction to be gained from selling 'Fit for Purpose' rams, as they will pass their superior genetics on for more than two years. This 'added value' is the key to obtaining a premium price for this type of animal.

Concentrate feeding

Why are concentrates fed?

- Breeders who traditionally sell ram lambs generally lamb in winter to ensure more time for growth. This means there can be limited forage available
- Concentrates have high nutrient density, so good animal performance can be achieved
- The feeding value of grass is generally under-estimated and it takes good management to achieve consistently high quality forage
- Early access to creep stimulates rumen development and can compensate for the falling milk yield of ewes
- They are good carriers for high quality rumen undegradable protein, trace minerals and vitamins. Zinc, selenium and vitamin E are particularly important, as they have been shown to improve sperm production and survival.



Why is feeding high levels of concentrates bad?

- Excessive feeding can disrupt normal body growth and development
- Feeding high levels during periods of rapid growth in young rams reduces bone strength and density
- Rearing lambs on high levels of feed could reduce their foraging ability, which has implications if they are sold into high grass or forage systems
- Heavy over-feeding of rams prior to sale causes over-fatness and reduces fertility
- It takes three weeks for the rumen to adapt to a significant diet change, so heavy feeding before sales means that rams moved onto grass need at least three weeks before they are ready to work
- Mounting evidence shows that animals selected on high concentrate diets for good growth rates do not always have the same performance on high grass or forage diets. It is important to understand the production systems clients are using
- Cereal based feeds are becoming much more expensive.



High growth rates, which have been stimulated by heavy concentrate feeding, result in animals with:

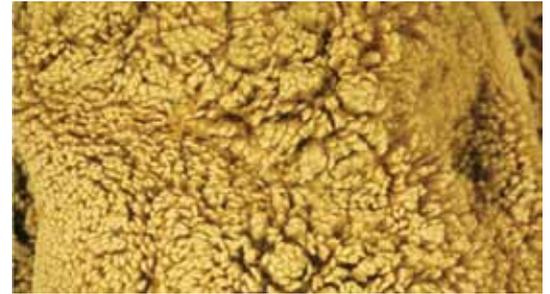
- higher levels of fat in their muscle (intermuscular fat)
- a weaker skeleton
- smaller, less dense muscles
- less robust connective tissues

which can lead to poor mating ability and longevity.

The effect of concentrate feeds on...

The rumen

- Concentrates decrease the pH of the rumen making it more acidic. This slows the breakdown of plant fibre by rumen microbes which can lead to acidosis
- Acid conditions can damage the lining of the rumen wall (photo to the right is a good rumen). This means bacteria can enter the blood stream leading to liver abscesses and possible sudden death. Ground or milled, energy-rich cereal grains such as barley, wheat and maize are the worst offenders.



How to avoid acidosis

- Feed whole grains and do not exceed 40% of the dry matter (DM) of the diet
- When housed always provide long roughage, eg a minimum of 50g of hay per day, to encourage saliva production which can neutralize any acid present
- Allow enough trough space so all animals can eat together at the same time and always provide access to water
- Build up gradually to full rations and do not feed more than 0.5kg per feed
- If using TMR, mix the ingredients so they cannot be sorted out into constituent parts
- If using compound feeds make sure they are designed for rams, preferably by including ingredients with large particle size
- In home-mixed rations use whole grains, eg cereal - 57.5% with dried sugar beet pulp - 25%, soya bean meal - 15% and intensive lamb mineral - 2.5%.

Bone development

High growth rates promoted by heavy feeding reduces bone density and lowers the concentrations of calcium (Ca) and phosphorus (P) in bone. For a given rate of liveweight gain, ram lambs eating grass as opposed to concentrates have much stronger bones. This is reflected in higher contents of the key structural mineral elements Ca and P (see Table 2).

Table 2: Effects of feeding regimes, access to grass on calcium and phosphorus retention and composition of bodyweight (g/kg)

Mineral	Composition of empty bodyweight gain (g/kg)		
	Grass outdoors	Grass indoors	Concentrate indoors
Calcium	9.6	9.4	5.6
Phosphorus	5.2	4.5	3.8

Source: Wan Zahari *et al* (1989)

- Concentrate-fed lambs are prone to joint defects and problems involving cartilage, such as dyschondroplasia and osteochondrosis. For January-born lambs on *ad-lib* creep feeding at grass these defects manifest themselves in lameness/wobbly walking in May
- The problem is linked to the pH status of the lamb's blood. Attempts to avoid the condition by including bicarbonate in the concentrate diet increases the risk of triggering urinary calculi or urolithiasis.

Kidney function

- When rams are intensively fed with high levels of concentrate, urinary calculi or urolithiasis can be a problem
- Large stones of P and magnesium (Mg) salts may block the urethra restricting the passage of urine. It may lead to rupture of the bladder and death
- Calculi formation is due to high concentrations of P and Mg salts in the urine, brought about by excessive P (and Mg) levels in high concentrate diets, compounded by inadequate water supply. Such calculi have never been found in grazing animals.



How to avoid urolithiasis

- Feed less concentrates (high availability of P) and feed high forage diets (lower availability of P)
- Include 1.5% salt in the diet to promote a higher water intake to dilute the urine. The total sodium (Na) content should be about 6g/kg DM
- Allow access to plenty of clean fresh water, as low water intake increases the concentration of minerals in the urine
- Feed a high ratio of Ca : P as this reduces the absorption of P so less is available for urinary excretion. This ratio should be at least 2:1 but preferably nearer 3:1
- Feed diets low in P (less than 4.6g/kg DM) and Mg (less than 2.3g/kg DM)
- Adding ammonium chloride to the diet to reduce the pH of the urine, helps to minimise the risk of crystal formation, which is how stones start
- Over-correction with ammonium chloride increases the risk of the bone development problems referred to on page 4. This requires careful diet formulation, particularly as protein sources such as rapeseed meal and feed co-products like middlings, rice bran and molasses are high in Mg.

Testicles and sperm production

- Excessive concentrate feeding leads to a high fat content in the scrotum, which raises the temperature within. This reduces sperm numbers and increases the number of abnormal sperm
- These effects are compounded by increased heat production and extended lying times which often occur when rams are fed high levels of concentrate. If concentrate feeding takes place indoors, bedding around the feeding troughs, where animals often choose to lie, can become contaminated with feed. The resulting increase in temperature caused by the fermenting feeds adds to the adverse effect of scrotal heating on sperm quality
- High scrotal temperatures reduce testosterone levels which decrease libido
- Other associated detrimental effects are reduced sperm survival, especially following freezing and thawing during semen storage and AI, and increased embryo mortality
- High levels of concentrate feeding have significant impact on scrotal and semen characteristics. (Table 3).

Table 3: Effects of feeding regimes on scrotal and semen characteristics

	Grass plus bucket	Ad-lib concentrates
Scrotal fat (g)	45	109
Semen volume (ml)	1.1	1.1
Motility index	3.3	2.3
Semen concentration (million/ml)	1170	732
Percentage of normal sperm %	88	83

Source Fourie *et al* (2004)

Note: 32 Dorper rams were used in this experiment. The rams were around 16 months old and were on their respective diets for seven weeks before the measurements were taken.

The effect of concentrate feeds on...

Estimated Breeding Values (EBVs)

There are some common misconceptions amongst commercial ram buyers.

- Rams need to be performance tested on a high plane of nutrition
- Flocks can obtain higher EBVs by feeding more.

Providing that acceptable amounts of genetic linkage are established between recording flocks, Best Linear Unbiased Predictions (BLUP) produced by Signet, can do an excellent job of taking into account differences in flock management which relate to feeding and health.

In recent years a number of flocks have changed their management system, reducing the amount of concentrates fed, lambing later and exposing lambs to more commercial conditions, such as including mild parasite challenges.

Signet analyses can still identify lambs with superior genes for growth, even when they are grown on a lower feeding level and are lighter at scanning than those reared in more intensively fed flocks.



Breeding Fit for Purpose rams

Most pedigree breeders are producing rams to sell to commercial producers. But how similar is their system to their clients'?

Pedigree terminal sire flocks have traditionally lambed early in the year, with lamb growth rates maximised through the use of high energy diets to optimise their performance in the show and sale ring.

Even for hill/maternal breeds, the performance recorded nucleus flock is sometimes brought onto improved in-bye pasture, in part to aid accurate pedigree recording, but also to manage and nurture lambs thought to possess superior genes.

A potential concern is if genes express themselves differently in one environment when compared to another. A sheep recording system is far less valuable if it promotes sheep whose genetic potential is only expressed under show management and not under commercial conditions.

The degree to which this influence should be a concern relates to the degree of interaction observed between an animal's genetic make-up (G) and the environment in which it is reared (E), referred to as a 'GxE interaction'. If the rankings observed in animal performance are the same under a range of environmental conditions then GxE interactions are much less of a worry.

Figure 1 highlights a common situation in recording systems - the progeny of three rams perform differently on two farms. In this scenario the ram with the best genes (Ram A) under one environment is also deemed to have the best genes in the other – but its superiority is reduced. Modern BLUP models can handle (and indeed expect) differences in the levels of environmental (phenotypic) variation expressed in different flocks.

However, if animals rank completely differently then the value of performance recording under preferential management has to be called into question.

Figure 2 shows just such an interaction. In this example the progeny of Ram A do not thrive on Farm B. There may be many reasons for this re-ranking. Perhaps lambs faced a severe worm challenge on "dirty" Farm B, not experienced on high health status Farm A. In this example it would have been better to test the rams under the conditions experienced on Farm B.

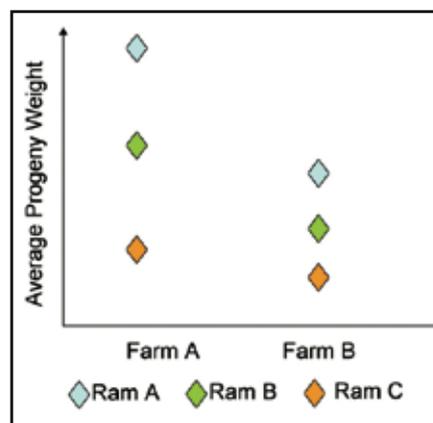


Figure 1: Progeny of three rams ranking the same in two different environments

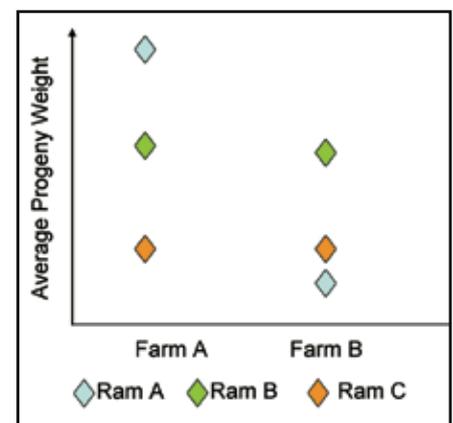


Figure 2: Progeny of three rams with altered ranking in two different environments

How big a concern is GxE interaction?

It is important that the performance of the commercial progeny produced by recorded breeding stock meet the expectations of commercial producers, passing on measureable differences in the key economic traits.

It would be a concern if genes key to survival, such as mobility, grazing behaviour, tolerance to disease/temperature, maternal behaviour and lambing ease, were lost through intervention in a performance recorded population.

Whilst large GxE influences are seen between breeds (which is why hill breeds dominate their native habitat, but are out-performed on lowland pasture), the degree to which they exist within breeds is less clear.

A number of farm trials have been undertaken showing the genetic differences observed in sires selected under pedigree management are replicated on commercial farms. But there have also been some where the differences were less clear and the influence of GxE is thought to have been more influential. For this reason EBLEX has committed funding to look further at the implications of GxE interactions.



Testing under the right conditions

When animals are reared under a more controlled environment, where nutrient availability is consistent, concentrates could be fed or good grazing management employed, the measurements are less heavily influenced by the environment.

This means higher heritability estimates can be achieved, resulting in faster rates of genetic gain. The heritability of a trait is the proportion of the differences in a population which are genetically determined and hence that can be passed onto the progeny.

Just as overfeeding can be a concern, it is also a big mistake to bombard a flock with such extremes of management (or mismanagement) in terms of health and nutrition, so that lambs with superior genes cannot be detected at all.

For example, studies by Bishop *et al.* (1996) have indicated the heritability of muscle depth was twice as high on improved pasture relative to unimproved pasture. This is a clear reminder that the assessment of performance can sometimes be more reliable under improved management.

In a similar manner, Pollott *et al.* (2004) showed the heritability of resistance to worms (and hence the potential rates of genetic gain in this trait) was considerably higher in an environment with a high worm burden.

Key messages

- Be aware of GxE interactions, particularly where stock is likely to be used under a range of environments, climates and management regimes
- Take action if there is evidence that problems are occurring
- Select animals reared under the same environment as the one they are moving to if there is a concern about potential GxE
- Do not let the threat of potential GxE interactions affect the decision to utilise superior genetics. But do collect data to ensure the animals are performing well.

Obtaining accurate EBVs in lower input systems

If breeders want to test their sheep on a lower input system, then the following suggestions are worth bearing in mind.

Tips	How	Why
Ensure high levels of genetic linkage to other recorded flocks	Ensure some of the lamb crop is by a ram used in other recorded flocks. This is most easily achieved using AI	To ensure the BLUP analysis recognises that lower levels of lamb performance are due to the management of the flock, not their genetic merit
Ensure high levels of linkage within the flock across seasons	Use stock rams for more than one season	To ensure the analysis recognises that lower levels of lamb performance are due to the management of the flock, not to a new team of sires
Manage all of the recorded lambs in the same way	Maintain a tight lambing period and provide similar feed/forage/health to all	This will eliminate environmental bias
Consider scanning later	Book a later scanning appointment	Lambs need to be expressing differences in muscling and fat depth – if lambs are grown more slowly this will take longer to achieve
Pay attention to forage availability	Forage budgeting	If forage availability is greatly restricted results can be compromised as lambs are affected in different ways. Later born lambs may be artificially favoured
Pay closer attention to health care	Health planning and monitoring	Results will be compromised as some lambs will be exposed to a greater challenge than others

High performance diets



Sam Boon

Signet Breeding Services

"Forage-based diets can be high performance diets. However in general, relying on grass tends to lead to lower levels of performance, more similar to commercial management, than concentrate based diets."

Ram producers involved in performance testing need to consider whether they wish to test their lambs under a low or high input system".

Advantages of using a lower input system

- Less chance of GxE interactions (within reason)
- May be more cost effective

Disadvantages

- Rams smaller and less forward in condition
- Greater marketing effort required

NB: Commercial management does not mean poor management.

Alternatives to concentrates

Grass and other forages can reduce the amount of concentrates needed within a ram production system. It takes careful management and monitoring to ensure feed quality and quantity is right, rather than just relying on a bag of feed.

The traditional image of ram breeders with small areas of permanent pasture on their farms, may need to change if they want to produce 'Fit for Purpose' rams off forage.

All production systems should make the most of grass and forages as these are the cheapest feeds on the farm.

Generally grass growth peaks in May (see Graph 2), falls through the summer before rising again in the autumn before reducing in the winter. The most efficient production systems are those that match the supply of grass with their demand for feed. This will be reflected in the lambing date.

In the example shown in Graph 2, lambing in late March/early April means that the rising demand for feed from lactating ewes can be met by grass. Weaning coincides with the drop in grass supply, so ewes can be dried off and lambs given the priority. The autumn growth surge helps with flushing the ewes.

However, managing grass is not easy and growth patterns change every year. But these hurdles can be overcome by monitoring grass growth and adapting the system to suit. For example, growing clover-rich pastures or forage crops can help spread the risk of dry summers. Using target sward heights for putting animals in and out of pasture are also important, and a key way of maintaining feed quality within a grass-based system.

Graph 2: Seasonal grass growth and animal requirements

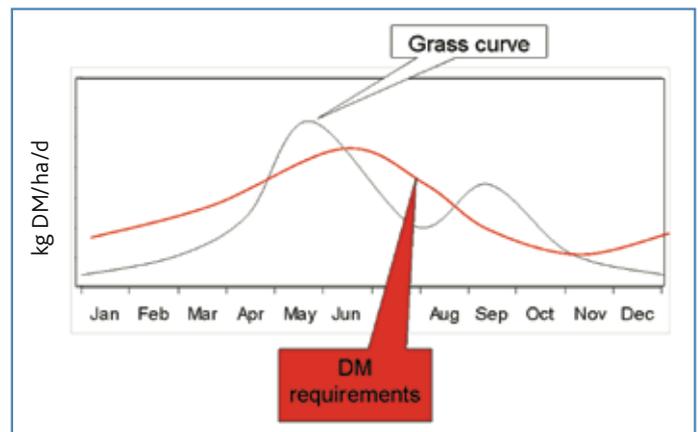


Table 4: Optimum grazing heights for sheep

Class of stock	Grazing period	Rotational grazing		Set stocking (cm)
		Pre-graze (cm)	Post-graze (cm)	
Ewes and lambs	Turn-out > May	8-10	4-5	4
	May > Weaning	8-10	4-6	4-6
Pre-tupping	Sept > Nov	8-10	4-5	6-8
Weaned finished lamb	July > Sept	10-12	5-7	6-8

Rams that graze are fitter, have stronger legs and joints, and will be like the sexual athletes the industry needs. More ewes can be allocated to fitter rams.

For ram production businesses based on grass and forage it is very important that grass supply and demand is understood. EBLEX is developing tools and advice on grazing strategies to help with this.

Feeding young lambs

In the first few weeks of life, milk is the primary source of nutrition for lambs, so the priority should be to ensure ewes produce enough milk.

When lambs are four to six weeks old they obtain as much as half of their nutrition from non-milk sources. When they are eight to ten weeks this figure rises to more than 75%. Their rumen is fully functional by eight weeks.

In a survey of 103 pedigree Suffolk, Texel and Charollais breeders in 2011, at eight weeks:

- 51% of lambs were on *ad-lib* creep (8% were feeding once a day and 12% feeding twice a day)
- 29% of respondents did not feed creep
- 18% of lambs were on improved grass leys or forage crops, including two flocks on chicory and a further two on forage crops.

Target daily liveweight gain at eight weeks for lambs being sold as ram lambs = 350g/day

Target daily liveweight gain at eight weeks for lambs being sold as shearlings = 350g/day

High feed value grass is crucial for ewes and lambs at this stage. Generally a sward height of around 4-6cm (1,345-1,650kg DM per ha) is ideal.

Set stocking is the preferred grazing strategy for ewes and young lambs, but maintaining a tight sward is essential. Monitor sward heights weekly during periods of high growth or high demand to ensure stocking rate is appropriate.

The challenge with small pedigree flocks is that there may not be enough grazing pressure to maintain sward quality when grass is growing rapidly. It may be necessary to bring in other stock, such as replacements to increase feed demand.

Spring grass has a metabolisable energy (ME) of around 12 MJ and a crude protein (CP) of over 20% - if managed correctly.

Focus on perennial ryegrass and clover

Suffolk Breeder in the Midlands

"My decision to move towards a forage-based system was due to converting to organic five years ago. Buying concentrates to satisfy demand for January lambing was not cost-effective, so I changed to a March lambing flock.

I focus on perennial ryegrass and white clover leys for ewes and lambs, and graze them tightly through the year. Clover is important as it helps the protein level going into the lactating ewes and fixes nitrogen for the ryegrass.

I have had some problems with clover stones, similar to urinary calculi, so I ensure rams are on mixed grass and white clover swards to reduce clover intake.

I sell all my shearling rams direct to customers from the farm, and I have a lot of repeat business. I am happy with my current system and would not go back to lambing in January."



Feeding growing lambs

Weaning is a tricky period as the stress of this procedure coincides with poor grass growth and reducing feed quality.

Rotational grazing may help to boost quality if there is a group following the ram lambs that can eat down the grass to make sure target sward height residuals are met, eg castrated lambs or well-grown shearlings. This means that the ram lambs get the best grass and can be moved on quickly, and the following group can take sward height down to 4-5cm (1,354-1,500kg DM per ha). This means when the ram lambs come to this pasture again grass quality is optimum. See grazing targets on page 9.

In the survey of 103 pedigree producers, at twenty-one weeks:

- 21% of respondents' lambs were on *ad-lib* creep (29% were feeding once a day and 24% feeding twice a day)
- 26% did not feed creep
- 31% of respondents' lambs were on improved leys or forage crops, including five flocks on chicory, three on red clover and another five on forage crops.

Target daily liveweight gain at 21 weeks for lambs being sold as ram lambs = 250g/day

Target daily liveweight gain at 21 weeks for lambs being sold as shearlings = 200g/day



Balancing concentrates with grass growth

Hugh Skinner

Romney and Texel breeder, Kent

"I use forage crops to feed ram lambs when there is low grass availability in late summer and autumn. After weaning in early July, the ram lambs are moved onto grass (with some concentrate if necessary). At the beginning of August they are moved onto stubble turnips with 250g of concentrate per day.

They are off-wintered on a neighbour's grass fields from October/November until February (with 65g per day). They come back home and onto kale with 250g per day, until they go on to spring grass in March, fed 250g per day concentrates.

Concentrate feeding ceases when the spring flush appears. From mid July, concentrates are fed in conjunction with stubble turnips in preparation for the shearling sales. Concentrates just give the final finish to the rams to help their selling potential, but I do aim to have them fit not fat!

Five-year-old leys are sprayed off with glyphosate in May/June. Half the field is direct drilled with stubble turnips and chicory mix, while the other half is drilled with kale for later use.

I have had to use more concentrates recently due to the lack of rainfall and subsequent poor grass growth.

I sell around 90% of my Romney shearlings and about 50% of my Texels directly off farm."



Forage crops and brassicas

Grazing stock on brassicas can add flexibility to feeding but can also bring new problems to the farm. Talk to the vet about any potential health risk and how to incorporate prevention techniques into the health plan.

Summer forage crops drilled to feed growing ram lambs are very useful. Brassicas, such as stubble or grazing turnips and rape/kale hybrids can be sown into a grass field after first cut silage for grazing 90 days later. They can be a useful part of a re-seeding programme.

More information on growing and feeding brassica forage crops in **Beef and Sheep BRP manual 6**.

Email brp@eblex.ahdb.org.uk or call **0870 241 8829** for a free copy or view and download at www.eblex.org.uk.

Chicory

Chicory with red and white clovers (plus plantain) can be used as an alternative to heavy concentrate feeding.

This mixed sward should be rotationally grazed using four paddocks, which are grazed for around seven to 14 days each depending on growth. Good growth rates could be expected (200-300g per day) especially when rotationally grazed.

Sown in May, there should be feed available for grazing in July. The first grazing needs to be hard, from 20cm to 5cm in under a week with ewes and lambs.

Ram lambs/rams can then go onto the re-growth three to four weeks later. Second year chicory can be grazed from April or May. Again use hard grazing pressure with ewes and lambs or hoggets for the first grazing to prevent the crop bolting. The sward should last three to four years.

Each hectare will feed 110 rams to mid September and then 75 to late October (45 and 30 per acre respectively).

Chicory has natural anthelmintic properties and can halve the number of wormer drenches required.

Download EBLEX BRP Action for Profit sheet – **Better Returns from Forage Chicory** – for more information at www.eblex.org.uk.



Make good use of grass



Charlie Morgan

Independent grass consultant working with ram breeders

"Some of my clients want their sheep never to touch any concentrates, others want to reduce the amount fed, while others want to understand their feed supply and demand better. They all want to ensure they are producing the right type of rams for their commercial clients.

The key for them all is having good grass and making good use of it. But to achieve quality forage they need to measure sward heights or kg DM per ha using a plate meter, and then monitor stock growth rates to ensure the animals are converting the grass to meat efficiently.

Just as commercial producers have target weights for slaughter, breeders producing ram lambs need to hit growth targets to ensure they are ready for sale.

Culling ewes and rams that don't perform on forage-based systems is also fundamental to ensuring the end product gets better and better."

Trace elements

- Forage may be deficient in cobalt, copper, selenium, zinc and iodine. The vet can check levels with blood tests and suggest appropriate treatment
- Measure if there is a cost-effective response to treatment, eg higher growth rates, improved carcass weights
- Rams have a high requirement for zinc, cobalt and selenium
- Deep rooting plants, like red clover and chicory, can have two to four times the level of trace elements found in grass
- Red clover can contain high levels of copper if grown on high copper soils. This can lead to toxicity if grazed for long periods of time. This is something to watch in susceptible breeds such as the Texel and Lleyn. Liver samples from slaughter lambs can be used to check levels.



More information on trace elements with case studies in **Trace Element Supplementation of Beef Cattle and Sheep** available to download at www.eblex.org.uk click on 'Better Returns Programme', then 'literature' then 'BRP+'.

Feeds that impair breeding

Red clover

- Grazing red clover, or eating red clover silage, around tupping is known to affect ewe fertility. Avoid feeding to breeding females for six weeks before and after tupping
- Grazing ewe lambs on red clover leading up to tupping can cause short-term infertility. However, this can be resolved after one month on grazing swards with no red clover
- There is little evidence to suggest that grazing red clover, or eating red clover silage, affects ram semen quality or quantity.

A few cases of 'clover stones' have been seen in rams in England when grazing high levels of clover, resulting in similar problems to urinary calculi. Clover stones can affect ewe, ram or wether lambs on white or red clover.



Human sewage sludge

Avoid grazing pastures treated with human sewage sludge during early pregnancy by ram breeding flocks, as exposure to chemicals in the sludge can reduce the number of cells within the testicles that produce sperm.

Feeds high in magnesium

Avoid high magnesium content feeds that predispose to urinary calculi.

The upper limit for magnesium content of feeds for rams should be 0.2% in the dry matter.

Table 5: Variation in magnesium content of common feeds fed to rams

Feed source	% Magnesium in DM
Rapeseed meal	0.56
Molasses	0.47
Soya	0.31
Dark distillers grains	0.30
Beet pulp nuts	0.30
Barley /wheat /oats /dried citrus	0.10 to 0.13

Producing ram lambs

Ram lambs can be sold from a forage-based system, but need careful management to ensure they hit liveweight targets. Ram lambs can reach puberty at four to six months. For successful mating they need to be around 60% of their mature weight. For example, a 100kg mature ram may be fertile at 60kg.

Concentrates can be fed but must not exceed a 60:40 forage to concentrate ratio (in relation to dry matter). This is a good guide to the maximum amount of concentrates which can be fed without compromising health. Never feed more than 0.5kg (1lb) per feed to prevent severe acidosis in the rumen.

Ram lambs on some forage may be eating around 3% of their liveweight as dry matter per day. For example, a 30kg ram lamb may be eating 0.9kg DM per day, which means no more than 0.42kg of cereals (0.36kg of dry matter at 86% DM) should be fed.

Targets for ram lamb production

Liveweight targets can be reduced by earlier lambing or later sale dates, but good forage quality and quantity is still required to achieve them. Regular weighing and health monitoring is needed. It is likely that only a proportion of the male lamb crop will hit these targets off forage alone. Other targets may need to be set if your market requires higher weight at sale.



Scrotal circumference

Measuring scrotal circumference can give an indication of whether ram lambs are ready for breeding.

Table 6: Target weights and daily liveweight gains for ram lamb production

Period	Age (days)	Target weight (kg)	Daily gain (g/day)	Feed
Birth @ 5kg on March 15th to weaning	90	37	350	Milk and grass
Weaning to scanning (mid August)	150	52	250	Grass or chicory and clover or forage crops
Scanning to sale (mid September)	180	60	250	Grass or chicory and clover or forage crops

Producing lambs commercial farmers want

Patrick Goldsworthy

Southdown breeder, Cambridgeshire

"I have only recently started breeding rams, but my system is based on:

- a) Sheep are ruminants so I want to get the most out of my grass*
- b) I want to have the nutrition right so that rams maximise their potential without becoming overfat. I am planning to sell ram lambs and shearlings.*

Around 80% of my grass is high sugar grass and white clover leys, on land that was previously arable. I use a reasonable level of nitrogen – up to 180kg N per ha (140 units per acre) to maintain high stocking rates, as land is at a premium in this arable area.

I do provide creep to lambs to compliment the grass, as this is a dry summer area. Last year's ram lambs grew between 330-460g per day. I want to make sure my rams can produce what commercial farmers want – a lamb that grows well early.

My ram lambs are housed during the winter and fed on hay and a home-mixed ration of sugar beet pulp and soya. The non-forage component represented around 30% of their dry matter intake and 40% of their energy."



Producing shearlings

A ram lamb born in mid March has the potential to reach 100kg by mid September the following year at 540 days of age. The growth rate targets post-weaning are slightly lower than for ram lambs. It is important to keep them growing well during their first winter. Forage crops or grass with some additional silage should meet their requirements.

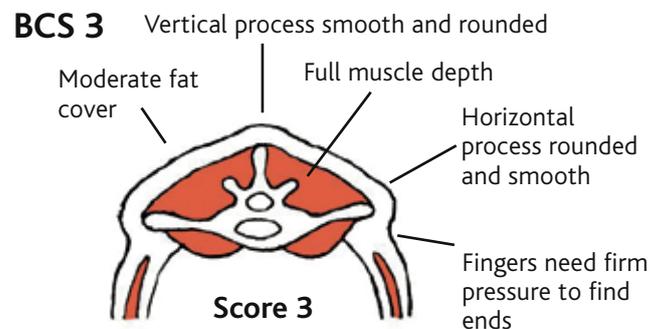
Table 7: Target weights and daily liveweight gains for shearling production

Period	Age (days)	Target weight (kg)	Daily Gain (g/day)	Feed
Birth @ 5kg on March 15th to weaning	90	37	350	Milk and grass
Weaning to scanning (mid August)	150	49	200	Grass or forage crops
Scanning to spring (mid March)	365	73	115	Grass/silage or forage crops
Spring to sale (mid September)	540	100	150	Grass or forage crops

Target Body Condition Score (BCS) 3-4 at sale

It is important to monitor body condition as well as weight as rams approach sale.

They should be in good condition, but not overfat. When the edges of the horizontal and vertical processes in the loin area are felt they should feel well rounded.



Cutting down feed costs

Charles Sercombe

Charollais breeder, Leicestershire

"About five years ago, I looked at my business and realised that my high feed bill had to change. I knew I had the correct genetics and wanted my animals to perform in a similar system to my commercial clients.

I have changed to mainly March lambing. I mainly sell shearlings off farm, and only feed concentrate in the last six weeks towards sale to increase condition.

In 2011, the dry summer meant I probably started feeding concentrates a little earlier than planned to the shearlings. My ram lambs were moved onto a rape/westerwold mix after weaning in August, then onto dairy pasture for the late autumn. From the New Year they were out-wintered on forage rape. Previously they would have been in a shed being fed a significant amount of concentrates. I would say they perform just as well in the forage based system and it is cheaper.

With the change of system has come a change in the need for marketing. Clients who are interested in moving away from the traditional image of rams have to be targeted.

It is good to see clients being able to push up ewe to ram ratios, as my rams can now do the job they are designed to do – get ewes in lamb."



Managing young males

Homosexual behaviour is sometimes seen in rams. It is thought that mounting other males helps rams learn the correct mounting technique and is important in establishing dominance.

Work from the USA suggests that the proportion of rams that continue to have a preference for males when exposed to females is around 8%. Early exposure to females will not normally change their preference. These individuals need to be identified.

Weaning can encourage homosexual or sexually inactive behaviour.

Housing young ram lambs in all male groups may encourage homosexual behaviour.

Try to keep ram lambs and mature lambs separately, as the older rams may bully the younger ones.



Managing mature rams

If rams have been used for mating, they should be assessed for condition loss. If good quality grass is not available, it may be necessary for them to be fed up to 0.5kg (1lb) of ram feed with good quality hay or silage.

Extra supplementation can stop when BCS 3 is reached, as long as grass is available. They should be monitored during the winter to ensure they maintain weight and should be at least BCS 2 in the spring. Depending on forage quality this can be achieved by feeding up to 0.5kg concentrates per day.

If fully out-wintered, provided they have recovered bodyweight lost over mating, rams can be fed on grass, with access to hay or silage during bad weather and monitored for minerals and vitamin requirements.

Once grown, mature rams do not have high energy and protein needs, requiring about 25% less than a crossbred ewe at lambing.

Spring grass meets their full requirements for energy and protein. However, as the grazing season progresses, grass quality can fall and rams may lose condition.

Low stocking rates, commonly seen in ram paddocks, result in stemmy pasture of low digestibility. Frequent mowing where possible will help maintain pasture quality into July/August, when moderate concentrate feeding can be used if needed.



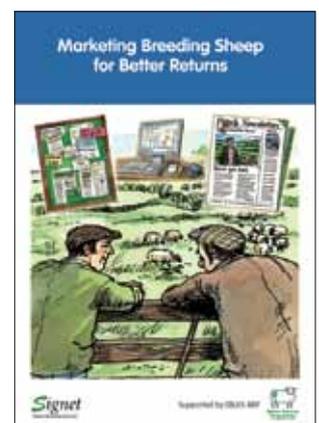
Marketing 'Fit for Purpose' rams

Breeding 'Fit for Purpose' rams may alter the way the flock is marketed. For example, there may be a need for on-farm sales or auctions, as it may be difficult to compete with over-fed rams in a sale ring.

Other ways to promote the flock are:

- communicating directly with existing and potential customers
- running a website
- having open days and evenings
- producing printed materials such as leaflets, posters, hats, pens, etc
- advertising in printed publications and on the internet.

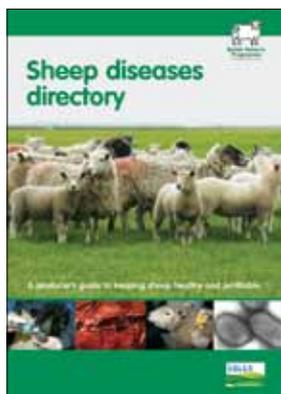
See the Signet Publication **Marketing Breeding Sheep for Better Returns** for more ideas and how to devise and implement a marketing plan. Email signet@eblex.ahdb.org.uk or call 024 7647 8825 for a free copy or view and download at www.signetfbc.org.uk



Health planning

Rams are susceptible to a range of diseases. The three most common are outlined here, but more information on others can be seen in the **BRP Sheep Diseases Directory** available from EBLEX – email brp@eblex.ahdb.org.uk or call **0870 241 8829** for a free copy or view and download at www.eblex.org.uk.

Consult the vet before making significant changes to the existing system, as the disease risk may change. It is important to put precautions in place.



Worms

Poor condition of rams can be due to worms, as they are often kept close to the yard in small fields which are constantly grazed. Rams are twice as susceptible to worms as ewes.

Carry out a faecal egg count on rams prior to tupping to see if they need worming. Follow SCOPS principles to achieve the best treatment outcome whilst reducing the likelihood of worm populations developing resistance to the wormers. Visit www.scops.org.uk for more details. Also in the EBLEX BRP Sheep manual 8 – **Target worm control for Better Returns** – email brp@eblex.ahdb.org.uk or call **0870 241 8829** for a free copy or view and download at www.eblex.org.uk.



Fluke

Rams are also susceptible to liver fluke which is a growing problem. It can be identified by signs of anaemia, bottle jaw and from eggs found in faeces.

Undertake a specific liver fluke faecal egg count before using a flukicide, unless there is a history on the farm, prior to the tupping period. Follow SCOPS principles when treating.

More specific details on controlling liver fluke in sheep can be found in the leaflet **Better Returns from Reducing Liver Fluke**. Email brp@eblex.ahdb.org.uk or call **0870 241 8829** for a free copy or view and download at www.eblex.org.uk.



Foot problems

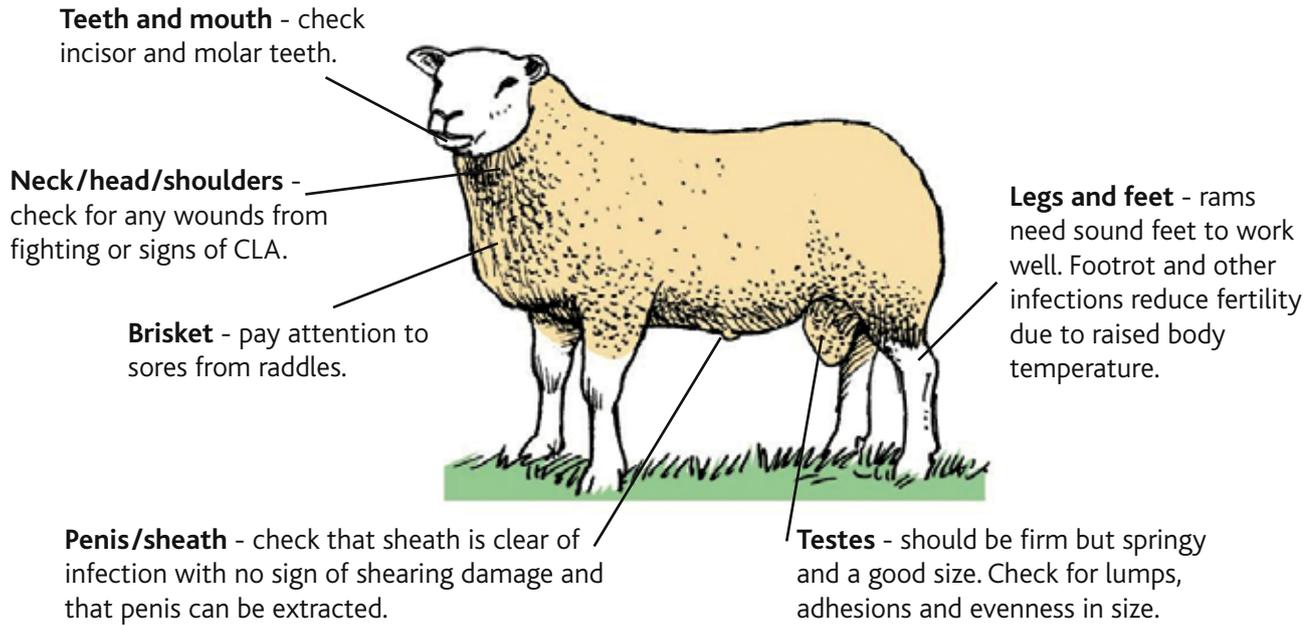
Rams are notorious for having foot problems. This may be due to an infectious disease such as footrot, or related to foot and leg conformation issues. It may be due to too much concentrate being fed when joints are developing (see page 4).

Treat animals rapidly for lameness, but consider culling if the same animal has been treated more than twice. For treatment advice, see the BRP manual **Target lameness for Better Returns** – email brp@eblex.ahdb.org.uk or call **0870 241 8829** for a free copy or view and download at www.eblex.org.uk.



Ram MOT

It is important to perform a ram MOT on any breeding rams at least ten weeks before the start of the breeding season. This covers all the important aspects following the five 'T's – teeth, toes, tone, testicles and treatments.



Good health status

Flocks that:

- are Maedi-Visna (MV) accredited
- monitored for caseous lymphadenitis (CLA)
- are scrapie genotyped
- have health plans, especially in relation to worms and scab will have a commercial advantage when selling rams.

An understanding of mineral status by blood tests may also be useful.

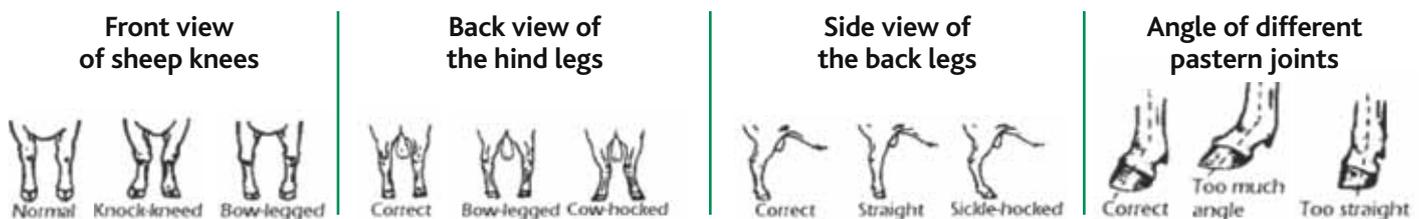
Encourage clients to quarantine rams they buy for four weeks once they arrive on their farm.

Breeding soundness

Prior to sale rams should be examined by a vet. Many potential reproductive problems can be detected by physical examination. If unsure, a vet can take a semen sample for analysis.

Offering a vet certificate to clients will highlight the ram's readiness for breeding, for example the one shown opposite is an example from British Veterinary Society and Sheep Veterinary Society.

Encourage clients to look at the conformation, including the leg and foot structure of any rams before purchase.



Appendix 1

Ram cost per lamb

How many lambs a ram produces in his lifetime determines the return on his purchase cost.

The table right shows the effect of the number of mating seasons and ewes per ram mated on cost per lamb born, assuming a lambing % of 150 and a £550 ram.

Over-fed rams may last two seasons and mate 40 ewes per year, which means it costs £4.58 per lamb born.

The aim of a forage-fed ram should be to tup at least 80 ewes per season and to last four years. This means the ram cost per lamb is around £1.

Table X: Annual ram cost per lamb produced (£)

Number of mating seasons	No. of ewes per ram			
	40	60	80	100
1	£9.17	£6.11	£4.58	£3.67
2	£4.58	£3.06	£2.29	£1.83
3	£3.06	£2.04	£1.53	£1.22
4	£2.29	£1.53	£1.15	£0.92

Increasing the ewe:ram ratio needs careful management, including provision of enclosed good grazing land, thoughtful pre-tupping care, no excessive concentrate feeding, and selection from flocks that focus on ram breeding fitness.

Appendix 2

Energy requirements for entire male lambs

Table Y was extended by ADAS in 2011.

The section that is shaded yellow was the original. With improved genetics animals are performing better than the authors of the original tables thought possible.

It is likely that the section shaded in green is impossible due to restrictions on dry matter intake.

Table Y: Energy requirements for entire male lambs

Live weight (kg)	Daily Liveweight Gain (g/day)									
	50	100	150	200	250	300	350	400	450	500
20	4.9	5.9	6.9	7.9	8.9	9.8	10.8	11.8	12.8	13.8
30	6.7	8.0	9.4	10.7	12.1	13.4	14.8	16.2	17.5	18.9
40	8.3	10.1	11.8	13.5	15.2	16.9	18.7	20.4	22.1	23.8
50	9.9	12.0	14.1	16.2	18.3	20.4	22.4	24.5	26.6	28.7
60	11.5	13.9	16.4	18.8	21.3	23.7	26.2	28.6	31.1	33.5
70	13.0	15.8	18.6	21.4	24.2	27.1	29.9	32.7	35.5	38.3
80	14.4	17.6	20.8	24.0	27.2	30.3	33.5	36.7	39.9	43.0
90	15.9	19.4	23.0	26.5	30.0	33.6	37.1	40.7	44.2	47.8
100	17.3	21.2	25.1	29.0	32.9	36.8	40.7	44.6	48.5	52.4

Note: Energy requirements are calculated using standard equations for fasting metabolism, activity allowance and growth (and include a 5% safety margin).

Appendix 3

Dry matter intake for entire male lambs

Maximum dry matter intake is around 3% of bodyweight for forages, but this may increase to 4-5% on high cereal diets.

Table Z: Dry matter intake for entire male lambs

Live weight (kg)	Daily Liveweight Gain (g/day)									
	50	100	150	200	250	300	350	400	450	500
20	0.41	0.49	0.57	0.66	0.74	0.82	0.90	0.99	1.07	1.15
30	0.56	0.67	0.78	0.89	1.01	1.12	1.23	1.35	1.46	1.57
40	0.70	0.84	0.98	1.13	1.27	1.41	1.56	1.70	1.84	1.98
50	0.83	1.00	1.18	1.35	1.52	1.70	1.87	2.04	2.22	2.39
60	0.96	1.16	1.37	1.57	1.77	1.98	2.18	2.39	2.59	2.79
70	1.08	1.32	1.55	1.79	2.02	2.25	2.49	2.72	2.96	3.19
80	1.20	1.47	1.73	2.00	2.26	2.53	2.79	3.06	3.32	3.59
90	1.32	1.62	1.91	2.21	2.50	2.80	3.09	3.39	3.68	3.98
100	1.44	1.77	2.09	2.42	2.74	3.07	3.39	3.72	4.04	4.37

Note: Daily dry matter intakes of animals on a 12 MJ/kg DM diet to achieve the energy requirements above.

For example: A 40kg lamb gaining at 250g per day requires 15.2 MJ of ME (Table X), and will have a dry matter intake of 1.27 (Table Y). 3% of 40kg equals 1.2, so this is possible.

