



Better Returns  
Programme

SHEEP BRP MANUAL 11

# Ewe fertility for Better Returns



**The information in this booklet was compiled  
by Dr Liz Genever and Nerys Wright,  
AHDB Beef & Lamb**

**Photography: Charollais Sheep Society,  
Ian Cairns, University of Warwick**

For more information, contact:

**Better Returns Programme  
AHDB Beef & Lamb  
Stoneleigh Park  
Kenilworth  
Warwickshire  
CV8 2TL**

**Tel: 024 7647 8834  
Email: [brp@ahdb.org.uk](mailto:brp@ahdb.org.uk)  
[beefandlamb.ahdb.org.uk](http://beefandlamb.ahdb.org.uk)**

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Any enquiries related to this publication should be sent to us at AHDB Beef & Lamb, Stoneleigh Park, Kenilworth, Warwickshire CV8 2TL.



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Ewe fertility is one of the main drivers underlying the output of a sheep flock. Optimising fertility increases the number of lambs scanned and born, which in turn drives flock profitability.

National surveys show that the productivity of English flocks has improved over the past decade, increasing from 108% in 2004 to 117% in 2015. This is an improvement of 8%, against a decline from 7.7 million breeding ewes to 6.6 million over the same period.

While this is an improvement, it lies some way behind the advances on the other side of the world. Australian sheep meat production has increased dramatically despite the declining national flock, falling from 170 million in the 1970s to 68 million in 2010. This lift in production has been assisted by developments in genetics and pasture and farm management, leading to higher carcase weights and lean meat yields.

Each farm's target will be different. The ewe breed, flock age profile, lambing time, land and labour availability all affect an individual farm's fertility target. Analysing previous year's data, setting realistic goals and working with a vet or adviser to ensure goals are attainable and cost-effective are crucial. The advances in electronic identification (EID) helps with data collection, but analysing the figures is crucial to make improvements in the flock.

Following the advice in this updated manual can help sheep producers to achieve set targets.



Nerys Wright

AHDB Beef & Lamb  
Knowledge Exchange Manager

# Establishing optimum fertility

The number of lambs reared will influence a farm's profitability. However, care is needed to ensure an increase in output is not accompanied by a disproportionate increase in costs.

Increasing the lamb crop within the range 1.5-2.5 lambs/ewe is likely to increase profit. However, every flock has an optimum level of fertility which is influenced by factors such as:

- Farming system
- Availability and quality of grass and silage
- Labour and skill level

## Aim to wean a ewe's weight in lambs

High lambing percentages make sense where there is adequate forage, feed and skill to manage an intensive system.

A lower lambing percentage can lead to heavier lambs that are finished more rapidly, which is ideal when forage is limited.

## Lambing percentage or numbers reared?

Both lambing and rearing percentages are important measures of a system's performance.

Lambing percentage	Rearing percentage
$\frac{\text{Number of lambs born alive}}{\text{Number of ewes put to the tup}} \times 100$	$\frac{\text{Number of lambs reared*}}{\text{Number of ewes put to the tup}} \times 100$

\* reared = sold as finished or store lambs, or sold/retained for breeding

Differences in lambing and rearing percentages will affect the financial performance of the flock.

Table 1: Example flocks aggregated data taken from Stocktake 2016

	Non-SDA flocks	SDA flocks	Feb-Mar lambing flocks	Apr-May lambing flocks
Scanning percentage	170	164	176	165
Lambing percentage	151	150	156	147
Rearing percentage	139	140	144	136
Lamb mortality (born alive to rearing) (%)	8	7	8	8
Total output (£/ewe)	93.70	91.39	97.56	90.88
Gross margin (£/ewe)	54.93	47.20	50.59	58.24

SDA = severely disadvantaged areas

# Recording performance

## What the records mean

Comparing **lambs born alive** with **lambs scanned** indicates the number of lambs lost during pregnancy through absorption, abortion or born dead. This can point to underlying issues such as disease or inadequate nutrition.

Comparing **lambs turned out** with **lambs born alive** indicates how many lambs are lost in the first few days of life. This may highlight underlying issues related to health, hygiene or colostrum intake.

Comparing **lambs weaned or sold** to **lambs turned out** indicates mortality over the first few months. This can highlight health problems, eg inadequate control of worms or infectious diseases.

Table 2: Comparing performance against industry standards

	System standards				Your flock
	Lowland ewes	Upland ewes	Hill ewes	Ewe lambs	Target*
A Females tupped	100	100	100	100	
B Lambs scanned	195	175	116	100	
C Lambs born alive	183	166	112	95	
D Lambs turned out or marked	172	156	104	90	
E Rearing percentage	168	151	100	85	
<b>Lamb losses</b>					
Empty ewes at scanning	2 (2%)	2 (2%)	2 (2%)	20 (20%)	
Scanning to birth (B-C)	12 (6%)	9 (5%)	4 (4%)	5 (5%)	
Birth to turn-out (C-D)	11 (6%)	10 (6%)	8 (7%)	5 (5%)	
Turn-out to weaning/sale (D-E)	4 (2%)	5 (3%)	4 (2%)	5 (5%)	
Birth to sale (C-E)	15 (8%)	15 (9%)	12 (10%)	10 (10%)	
Scanning to sale (B-E)	27 (14%)	24 (14%)	16 (14%)	5 (5%)	

\* Assume 10-15% improvement in each case

Source: LSSC Ltd



For more information, see – Sheep Manual 14 **Reducing lamb losses for Better Returns** at [beefandlamb.ahdb.org.uk](http://beefandlamb.ahdb.org.uk) or request a **Flock notebook** from [brp@ahdb.org.uk](mailto:brp@ahdb.org.uk) or **024 7647 8834**.



# Making the most of genetic potential

The performance of any animal in a flock is a result of both environmental and genetic factors. However, only the genetic factors can be passed to the next generation through breeding. There is a genetic element to almost any health or production trait, including fertility. Breeding selection can be based on any measured trait or group of traits to improve the subsequent generation to fulfil a desired flock objective.

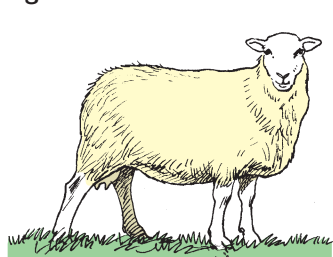
The degree to which one trait is passed from one generation to the next is termed 'heritability'. Traits with the highest heritability tend to be those related to growth and carcase conformation, while traits associated with health and fertility tend to have comparatively low heritability. However, genetic improvement of all of these traits still has a strong positive economic benefit.

Animals in a performance-recorded population can be ranked within the breed for each trait that is measured. This means the trait can be given a value known as an estimated breeding value (EBV). A group of economically significant EBVs can be grouped and weighted according to relative importance to provide an 'Index'. This gives buyers a simple mechanism to compare the relative overall genetic merit for each animal. For more information on EBVs, see Sheep Manual 2 – **Buying a recorded ram to generate Better Returns** manual at [beefandlamb.ahdb.org.uk](http://beefandlamb.ahdb.org.uk).

## Genetic traits that may influence ewe fertility

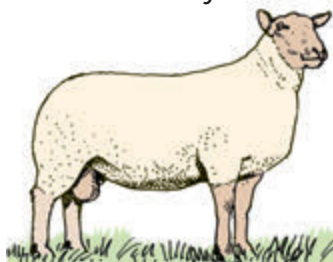
Simple policies, like not selecting females born from ewes that lamb late in the breeding cycle, or not retaining lambs born from ewes with a poor mothering instinct, will positively influence fertility and lamb survival respectively. Harnessing the power of hybrid vigour and avoiding inbreeding will also have a positive effect on ewe fertility.

Figure 1: Genetic traits that may influence ewe fertility



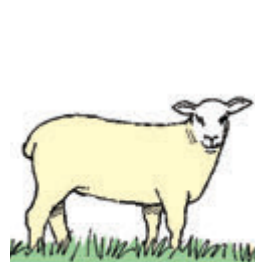
### Ewe traits

- Early maturity
- Out of season breeding
- Fertility – including ovulation and conception rate
- Number of lambs born\*
- Lambing ease
- Maternal behaviour (lamb survival)
- Maternal ability (milkiness)\*



### Ram traits

- Early maturity
- Out of season breeding
- Libido
- Sperm production



### Lamb traits

- Lamb vigour

\*EBVs can be used to influence these traits

# The sheep production calendar

Aim to optimise the number of lambs finished or sold from each ewe through careful management.

Dry (one to three months)	Post weaning (Ewe MOT)	Split ewes into groups according to body condition score (BCS) and identify pasture that will enable them to reach the optimum score at tupping	<b>Ram MOT</b>
	Four weeks after weaning	Assess ewe BCS to ensure thin ewes are gaining condition. Investigate those that have not gained 0.5 BCS after four weeks	
	Tupping	Flush ewes on good quality feed for three weeks before tupping to boost ovulation rate	
		Introduce rams to ewes and monitor each ram's performance to ensure they are working	
Pregnancy (four to eight months)	Early pregnancy	Prevent ewes losing condition or any abrupt changes in nutrition by having good grazing management and rationing. Stress for up to three weeks after rams are removed can affect embryo implantation	
	Mid-pregnancy	Use scanning data to separate ewes into groups depending on the number of lambs, lambing date and nutrient requirements	
	Late pregnancy	Feed ewes to meet their energy and protein requirements. Colostrum and milk production will be maximised and lambs will be more vigorous if fed correctly	
Rearing (nine to twelve months)	Lambing	Record numbers of lambs born and causes of lamb mortality. Record details of lambing ease, mothering ability and lamb vigour. Identify ewes for culling	
	Lactation	Feed availability in the first four weeks of lactation is crucial for peak milk yield at three to four weeks. This will maximise lamb growth rates. Supplementation may be required if grass levels are below 4cm high	
	Eight weeks post-lambing	The importance of lamb performance to eight weeks is important in defining their future performance. Weigh lambs at eight weeks to identify struggling lambs. Weigh and BCS ewes to identify those that require additional time to gain condition for mating next year	
	Weaning at 90 days (12 weeks)	Dry ewes off quickly, either putting them indoors on straw and water or onto a bare pasture for a few days. Check carefully for signs of mastitis	

Factors through the entire production year will affect ewe fertility, so it is important to understand the management changes that could optimise flock fertility.

Monitoring BCS and ensuring at least 90% of ewes are on target, will benefit flock fertility significantly. Nutrition during pregnancy and lactation can influence the numbers of lambs carried to term, subsequent survival and growth rates.

For more information, see Sheep Manual 12 – **Improving ewe nutrition for Better Returns** at [beefandlamb.ahdb.org.uk](http://beefandlamb.ahdb.org.uk).

# Culling ewes

Rigorous culling, that ensures only ewes fit for breeding are retained, is vital to flock productivity and profitability. No ewe should be kept if she is unlikely to rear lambs the next season. Bringing in better stock will raise flock performance.

Through the year, permanently mark or tag ewes if they have a problem that renders them unsuitable for further breeding, eg prolapse, mastitis. This allows for ease of identification at weaning time. Records and identification are key to successful culling. Having colour-coded ear tags for each year is a useful aid to culling efficiently on age. The introduction of individual ewe EID has made the process of collecting cull ewe data throughout the year easier.

## Six main reasons for culling

### 1) Body condition

**Lean ewes** – Ewes with a BCS of less than 2 at weaning should be culled if they have not regained at least 0.5 unit BCS, four weeks after weaning.

**Overfat ewes** – Ewes with a BCS of 4-5 at weaning may be barren or have not reared lambs last year. Check records to ensure the ewes are productive, if not, cull.

### 2) Udders

**Mastitis** – Ewes with lumpy or hard udder(s) or current infections should be culled. They will not yield enough milk and act as a disease reservoir.

**Low or slack udders, or large teats** – These may cause problems, as the lamb may struggle to locate teats without assistance. Risk of mastitis is higher.

### 3) Reproductive problems

**Barren including abortions** – Only consider retaining a ewe if the cause of abortion is known.

**Ringwomb** – Likely to recur.

**Prolapse** – Likely to recur.

### 4) Teeth

Teeth problems mean a ewe may not maintain sufficient body condition in the next production year, let alone rear lambs, as grazing and cudding is difficult.

### 5) Feet

**Lameness** – Investigate and treat. Cull if the ewe does not respond to treatment.

**Footrot** – Cull persistently lame ewes (treated more than twice in one year).

**Contagious Ovine Digital Dermatitis (CODD)** – Treat and keep away from other ewes until infection heals and the ewe is no longer infectious.

### 6) Lambing score

**Lambing ease** – Consider culling any ewe that needed any lambing assistance and do not retain their female lambs as replacements.

**Mothering ability** – Consider culling if the ewe leaves lambs or makes suckling difficult and do not retain female lambs as replacements.

## Action

- Efficient culling can increase flock performance by increasing lamb output and reducing lambing problems and vet/med costs
- Consider selling culls when price is higher, provided feed resources are adequate and returns outweigh the costs
- Use permanent marks or tags to identify ewes which have had problems during the year

# The dry period

## Body condition score

Body condition and the change in condition between weaning and mating, directly influence ovulation and conception rate. The dry period, after weaning until tupping, is when more than 90% of the ewes should be at an optimum BCS of 3-3.5\*. Ewes that are too fat or too thin, suffer reduced fertility and are less able to rear lambs successfully.

For more information on body condition scoring, see Sheep Manual 4 – **Managing ewes for Better Returns** at [beefandlamb.ahdb.org.uk](http://beefandlamb.ahdb.org.uk).

### Action

- Segregate ewes post-weaning into three groups – fat (>3.5)\*, fit (3-3.5)\* and thin (2.5 or less)\*
- Identify pasture that will enable ewes to reach optimum score (3-3.5)\* by tupping
- Realise that to gain 1 BCS, a ewe needs access to unrestricted high-quality grazing for six to eight weeks

\*Targets are for lowland type ewes

## Ram MOT

Rams need to be fit for the breeding season. Good flock fertility needs both ewes and rams in the correct condition.

### The four Ts: Teeth, Toes, Tone and Testicles

**Teeth** – If teeth are lost, or become long or thin, the ram may not eat well enough to gain weight before or after tupping. If body condition is not maintained, performance may suffer. Check for tooth abscesses along the jaw line, as this will also affect feed intake.

**Toes** – Lameness affects the ram's ability to mount ewes. Check older rams for arthritis. Examine each foot for evidence of infection and promptly treat any cases. Footbathing can prevent foot problems.

**Tone** – The ram's BCS should be between 3.5 and 4.0 as tupping starts. Good condition is vital as 15% of bodyweight can be lost during the six weeks of tupping. Too much loss of condition will affect performance.

**Testicles** – These should be large and as firm as a flexed bicep, as they produce more semen each day than medium-sized, soft testicles. Treatments, such as a clostridial and pasteurella booster, worm or fluke drench or treating any lameness, need to be administered at least ten weeks before the mating season. Lamé or unwell rams should be treated after discussion with the vet.

The semen production cycle takes about seven weeks, so ensure the ram is healthy at least seven weeks before tupping

### Action

- Examine rams ten weeks before tupping begins, to allow time to remedy problems or source replacements
- Provide shade for rams to avoid heat stress which can affect sperm viability
- Consider feeding high-quality protein supplement (16% crude protein) for six to eight weeks to improve testicle tone and boost semen production if BCS is low. Feed a maximum 0.5kg/ram/day

# Pre-breeding

The ewe's reproductive cycle lasts around 17 days, with oestrus (the fertile period) lasting two to three days. Ewes are 'short-day breeders', ie decreasing day length stimulates breeding. A few breeds, eg Dorset Horn and Poll Dorset, will conceive outside the normal September to January season without hormonal assistance.

Low bodyweight and poor condition delay cycling and onset of the breeding season, particularly in ewe lambs. Oestrus activity may also be reduced in fat ewes.

**Ovulation rate** is influenced by age, breed, stage of breeding season and nutrition/body condition.

- Nutrition and body fat reserves are closely related to ovulation rate. High protein supply increases ovulation rate. Prolonged under-nutrition can have long-term effects
- Younger ewes tend to have lower ovulation rates
- Ovulation rate reduces as the breeding season continues
- Some breeds, eg Belclare and Cambridge, have been selected for increased ovulation rates

**Flushing** – Increasing nutrition with forage or concentrates before breeding, increases ovulation rate in ewes and sperm production in rams. It is most effective when body condition is near target and if BCS is more than 2 and less than 4. Improved nutrition is needed for at least one

cycle (two to three weeks) to influence the ovaries to release more eggs.

**Proximity to rams** will stimulate ewes to cycle and ovulate earlier, by as much as three to four weeks. Pheromones from the ram stimulate ovulation in the ewe. This 'ram effect' can be achieved by housing and grazing rams near to the ewes.

Alternatively, a teaser (a vasectomised ram), can be run with ewes from 17 days before tupping is planned to start. One teaser per 100 ewes is sufficient. After 15 to 16 days, teasers are removed and replaced by entire males. This will coincide with the ewes' first true heat and most successfully mate in the first cycle. Using a teaser helps synchronise ewes so that the lambing period is more compact.

Do not flush on pastures containing red clover as it contains oestrogens that will affect ovulation rates. Keep ewes off red clover pastures for 45 days either side of tupping.

## Action

- Ensure body condition targets are met for maximum ovulation rate
- Consider using a teaser to improve the ewes' synchronicity and to produce a compact lambing period



# Tupping

The average ewe-to-ram ratio in lowland flocks is 40:1. Many farms will increase this to 80:1 or even 100:1. Appropriate pre-mating checks must be carried out in rams serving 80-100 ewes to ensure fertility is not compromised. Ewes that have been with a teaser ram will require more ram power and 30:1 is not uncommon.

A vet examination is suggested if a ram is used as the single sire for a group of ewes and when ewe numbers per ram are being pushed higher than previous years.

## Cost of ram (£/lamb)

Ram cost per lamb varies greatly depending on the ewe-to-ram ratio and ram longevity.

Table 3: Ram cost per lamb over four years of working life

Ewes/ram	Flock life of ram (years)				
		1	2	3	4
	40	£8.33	£4.17	£2.78	£2.08
	60	£5.56	£2.78	£1.85	£1.39
	80	£4.17	£2.08	£1.39	£1.04
	100	£3.33	£1.67	£1.11	£0.83

Assuming 150% rearing percentage and £500/shearling ram



While cattle breeders appreciate the value of compact calving periods (12 weeks or less), there has been little focus on the financial benefit of a compact lambing period. Benefits include:

- Ewes with similar requirements for feed
- Efficient labour use in a concentrated period of time
- Similar-aged lambs require similar treatments, eg vaccination
- Simpler post-lambing grazing and management

A compact lambing period increases demand on rams and it requires both ewes and rams to be in good condition and fertile. However, rams selected from flocks with good levels of libido and fertility should cope. Labour demand will be high and optimum lambing management is needed. This needs to be combined with rigorous culling and selection of ewes for good maternal ability, milkiness and lambing ease.

## Action

- Determine ewe-to-ram ratio and seek to increase ewes per ram without compromising fertility
- Calculate average lambing period and identify ways to reduce it, eg by removing rams after 36 days, or culling ewes served late
- Use raddles to check ram's progress. Change raddle colour every nine to ten days for best results
- Start with light-coloured raddles changing to darker colours. This will also help with housing, based on lambing date

# Early pregnancy

Aim to prevent embryo loss during this period

Ovulation occurs 12 hours after oestrus and fertilisation up to 24 hours later. However, implantation in the uterus does not occur for another 15 days. Any change in condition, diet or stress can impair implantation and reduce conception rate. On average, 15-30% of eggs shed at ovulation fail to develop. While some are not fertilised, many more fail to implant.

Nutrition has an important effect on embryo mortality. Poor feeding or body condition before mating increases embryo loss. High feed intake in early pregnancy can also lower conception rates.

## Foetal programming

Foetal programming is the idea that, during the development of the embryo and foetus, important physiological parameters can be affected by environmental events. This can have an impact into adulthood and even affect the following generation. The genetic code is not altered, but the switching on/off of certain genes is probably why the changes are seen. Nutrition in early pregnancy is thought to be one of the factors that affect gene expression in the foetus and can impact future breeding performance.

### Actions

- Prevent ewes losing condition and avoid abrupt changes in nutrition in the first month of pregnancy
- Utilise good grazing management and rationing for three to four weeks after rams are removed
- Allow thin ewes to gradually gain some body condition to ensure targets are being met
- Avoid stress associated with handling or moving fields in early pregnancy
- Take particular care of ewe lambs. They need 20% more feed in early pregnancy than mature ewes



# Mid-pregnancy

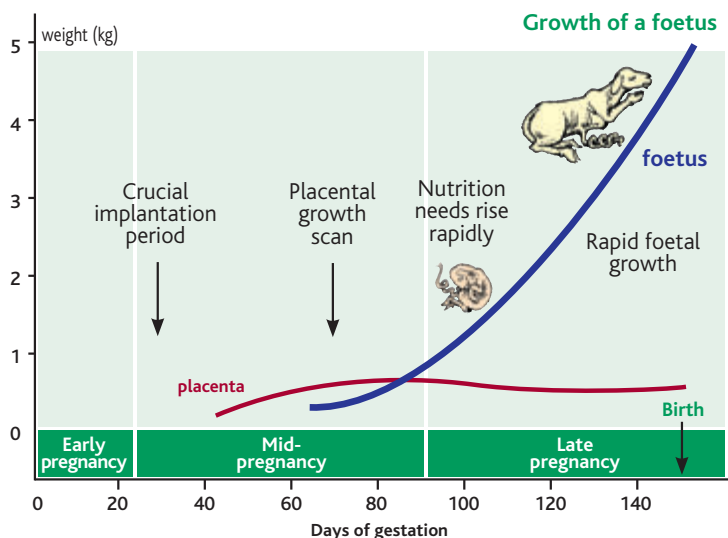
## Aim to optimise placental development

Adequate nutrition is needed as the placenta develops in months two and three of pregnancy.

The development of the placenta at this stage will impact lamb birth weights two months later.

Allowing ewes to gain or lose too much weight/BCS during mid-pregnancy can interrupt placental development, resulting in low birth weight lambs, irrespective of late pregnancy nutrition.

Figure 2: Key stages in the growth of a lamb foetus



Scanning can improve pregnancy management and contribute to the overall fertility management programme.

Scanning, normally at around 70 days from mating, identifies barren ewes with high accuracy. Culling these animals will reduce feed requirements. The number of lambs being carried can be identified with 90-95% accuracy, enabling ewes to be grouped and fed according to body condition and litter size.

After lambing, compare scanning results with the lambing percentage. Large differences need a management review of feeding, health planning and handling.

### Action

- Avoid ewes losing or gaining more than 5% of their bodyweight (0.5 BCS) during this period
- Manage thin and fat ewes to ensure their body condition targets are met
- Use body condition and scanning results to group ewes for feeding
- Calculate scanning percentage. Investigate empty ewes if above 2% at scanning

# Late pregnancy

Aim to meet the rapidly growing needs of the foetus in the last six to eight weeks of pregnancy

The last weeks of pregnancy are vital for a successful lamb crop, as this is when:

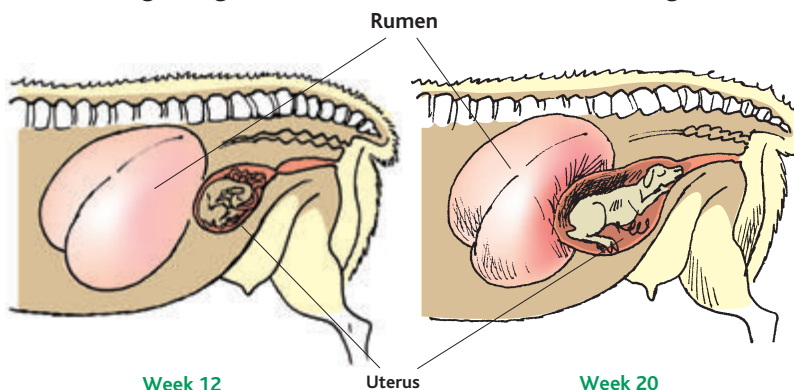
- 70% of foetal growth occurs
- Udder development occurs
- Colostrum is produced
- The ewe's appetite can reduce due to the growing lambs putting pressure on the rumen. However, they become more efficient at digestion so they can compensate as long as high-quality forage is offered

For more information see Sheep Manual 12 – **Improving ewe nutrition for Better Returns** at [beefandlamb.ahdb.org.uk](http://beefandlamb.ahdb.org.uk).

Nutrition to meet the ewe's increasing demands in the last six weeks is critical for lamb birth weight, vigour and survival. With appetite reducing as requirements rise, increasing the nutrient density of the diet, both energy and protein, is crucial. It will also increase the risk of mastitis during lactation.

Under-feeding ewes in late pregnancy is also known to have an impact on the ewe and lamb bond after birth. Ewes underfed in the last six weeks lick their lambs less and bleat less. As a result, lambs are more prone to starvation, due to poor weather and lack of colostrum.

Figure 3: The effect of the growing foetus on the rumen at 12 and 20 weeks gestation



## Action

- Monitor BCS regularly and maintain in the last six weeks of pregnancy (BCS 3 for lowland type ewes)
- Feed scanned ewes according to litter size. Group according to nutrient needs, eg lambing date and age
- Take blood samples to check for nutritional status in last three to four weeks of pregnancy. Three compounds can be tested for: beta-hydroxybutyrate (BHB) – normal level is  $<1.1\text{mmol/litre}$ ; urea normal level is  $>1.7\text{mmol/litre}$ ; and albumin (serum/plasma) – normal level during late pregnancy =  $>24\text{g/litre}$  from serum or  $>30\text{g/litre}$  from plasma
- Segregate lean ewes to receive preferential feeding, eg feed thin twins as triplets
- Feed to maximise colostrum, milk production and lamb vigour

# Lambing

Aim to maintain lambing percentage with good hygiene

**Lambing percentage** – This is influenced by how many lambs reach full term, as well as disease management and genetic traits such as lambing ease, maternal behaviour and lamb vigour. Nutrition remains important.

Good health planning is also important to ensure the lambs scanned are born alive. Diseases such as enzootic and toxoplasmosis abortion can result in losses of up to 20% of lambs scanned. These can both be controlled by vaccinating prior to tupping.

**Be prepared for lambing** – Equipment and colostrum supplies should be on hand, along with enough labour, ie one person for every 250 ewes for indoor lambing; one person for every 600 lowland ewes for outdoor lambing; or one person for every 1,000 hill ewes outdoor lambing. Make sure there are sufficient lambing pens indoors – as a guide, one pen for each five to eight ewes and a 'hospital area'.

**Maintain hygiene by:**

- Keeping equipment clean
- Washing hands and wearing disposable gloves
- Bedding lambing pens/area well
- Disinfecting pens between ewes
- Treating lambs' navels with a strong iodine solution, preferably alcohol-based

A good colostrum intake in the first 24 hours is vital to newborn lamb survival. It provides energy and other nutrients, passive immunity and is a laxative. The target is 50ml/kg birth weight in the first four to six hours. In 24 hours, a newborn lamb must receive the equivalent of 200ml/kg bodyweight in colostrum. For example, a 5kg lamb needs 1 litre of colostrum in the first day of life.

Wait until lambs are dry and preferably, 24 hours old before tagging.

For more information, see Sheep Manual 14 – **Reducing lamb losses for Better Returns** at [beefandlamb.ahdb.org.uk](http://beefandlamb.ahdb.org.uk).

## Action

- Consult the vet on a health plan to control diseases that affect lambing success
- Make hygiene a priority at lambing
- Weigh a proportion of lambs
- Keep a record of lambs that are given colostrum and are fostered, so their performance can be monitored
- Record details of lambing ease, mothering ability, lamb vigour and identify ewes for culling. This information will aid decisions on selecting replacements and reduce feed costs associated with unproductive ewes



# Factors affecting future fertility

Several factors will affect a ewe's future fertility

**Hygiene** – Clean lambing pens reduce the risk of spreading disease from one ewe/lamb to another. Lambs are born with no immune system, so a hygienic environment and access to good quality colostrum are essential to maximise survival.

**Treatments** – Ewes that become unwell will require prompt treatment to optimise chances of a full recovery. Ewes that are in pain are less likely to eat and this can have a detrimental effect on BCS and milk production. Before the start of lambing, talk to your vet and decide the best method of treatment for sick ewes post lambing.

**Prolapse** – Several factors are thought to cause prolapse in breeding ewes, from lack of exercise to calcium deficiency. No one factor has been proven to cause prolapse. However, one certain fact is that once a ewe has prolapsed, she is prone to do so the following year. Cull ewes that prolapse.

**Abortion** – Getting a diagnosis on the bacteria causing abortion in a flock is essential for knowing whether a ewe should be kept or culled. It will also help implement a vaccination programme for the future. The two most common causes of abortion in ewes are Toxoplasmosis and *Chlamydia abortus* (enzootic abortion). Both have effective vaccines that need administering prior to mating. Once a ewe has toxoplasma she is immune, so it is worth keeping that ewe (and vaccinating replacements). Toxoplasma is transmitted from cat faeces and wildlife, while enzootic abortion is transmitted from sheep to sheep.

**Mastitis** – Recent research has identified that nutrition (both energy and protein content) in late pregnancy and lactation has an impact on the incidence of mastitis. The management of young ewes lambing for the first time, is especially important to reduce the risk of udder damage and premature culling.

**Lameness** – Ewes that are lame at lambing time, especially when housed, will spread the infection to other sheep and their lambs are more likely to become lame. Some producers are concerned about using antibiotics in ewes that are heavily pregnant. Consult the vet, but it is likely that the implication of lameness, loss of BCS and spreading infection to others, will be more detrimental than the use of antibiotics in a lame ewe near lambing time.



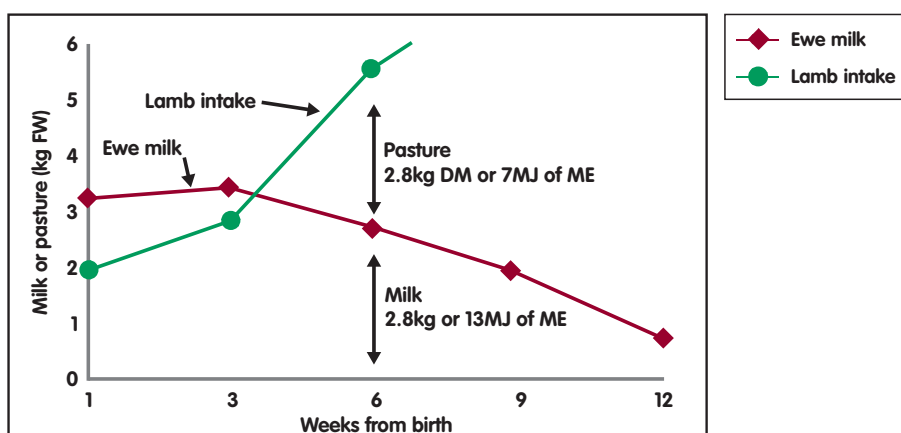
Always use antibiotics according to the data sheet and in discussion with your vet. Avoid blanket use of antibiotics in ewes and lambs at lambing time - targeted use is more beneficial.

## Weaning decisions

In the first six weeks after lambing, lamb growth rate is largely dependent on milk supply, after which lambs increasingly rely on pasture (with or without lamb creep feed). Figure 4 shows the transition between lamb nutrient supply from milk to grass in twin lambs. Lambs either need to start grazing or eating creep to maintain optimum growth beyond four weeks of age.

By six weeks of age, the twin lambs have a daily energy requirement of 20 megajoules (MJ) of metabolisable energy (ME) (10MJ of ME per lamb). For each lamb, energy supplied from milk is about 6.5MJ of ME leaving a gap of 3.5MJ of ME to be obtained from pasture, or additional creep feed if pasture is limiting. As the lambs get older a decision has to be made whether to continue supplementing the ewe to feed her lambs, or to wean and directly supplement the lambs.

Figure 4: The milk to grass transition for lambs reared as twins



Source: Beef + Lamb New Zealand Inc

Deciding when to wean is an important management decision that should be made each year, based on the following factors:

- Feed quality and quantity
- Ewe body condition
- Lamb performance



At 12 weeks of age (around 90 days), lambs are able to withstand the pressure of weaning. The lambs' dependence on the ewe has been reducing since about eight weeks of age. In some circumstances, leaving lambs on the ewes too long can be detrimental to both.

Weaning ewes below BCS 2 will have an adverse effect on the next production year, even if they are able to gain some, or most of that condition back. They are likely to scan with singles next time around and will have lighter lambs at weaning. The impact of allowing ewes to lose too much body condition is long term. Weaning thin ewes sooner allows them more time to recover condition, without affecting lamb performance.

If there are quite a few thin ewes with no obvious reasons, it is worth talking to the vet about testing some cull ewes for production-limiting (iceberg) diseases like Maedi Visna, Ovine Pulmonary Adenocarcinoma (OPA) and Johne's disease.

# Focus on ewe mortality

Annual ewe mortality is estimated to be 5-7% in England, with the majority of losses seen at or around lambing time. The target should be less than 3%.

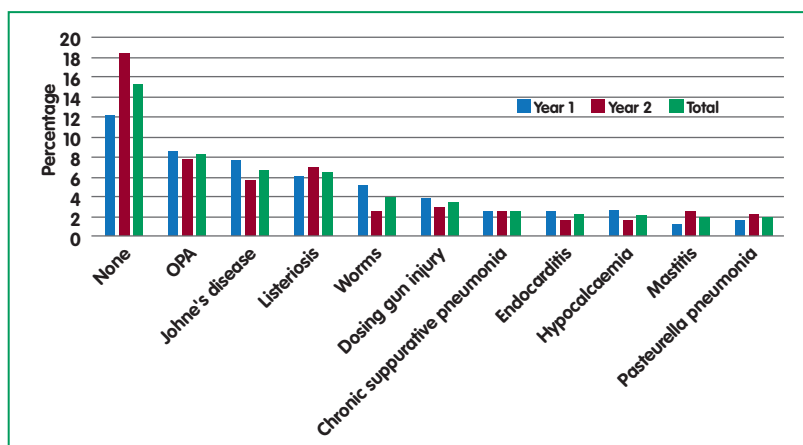
Recent AHDB Beef & Lamb-funded research at a fallen stock collection centre (FSCC) in County Durham, investigated the cause of death in adult ewes. Ben Strugnell of Farm Post Mortems Ltd continues to lead the activity, despite the formal project finishing.

Over two years, 530 adult sheep carcasses were examined during the project – 455 ewes and 75 tups.

There were over 90 different diagnoses for cause of death in ewes and the ten most common are shown in Figure 5.

No diagnosis was reached in 14% of cases across both years. Some of this was due to the producers not wishing to spend money on additional tests to find out the exact cause of death.

**Figure 5: The ten most frequent diagnoses made in adult ewes from March 2014 to March 2016**



Ovine pulmonary adenocarcinoma (OPA) was diagnosed in 8.4% (38 carcasses), which is consistent with previous estimates of incidence from examining fallen stock. The submissions were from 22 farms, with eight of them submitting multiple cases.

Johne's disease was found on 6.8% (31 cases) submitted to the FSCC over the two years, from a total of 25 farms, with five submitting multiple cases. This disease can be challenging for post-mortem (PM) technicians to diagnose, as it presents with multiple forms.

The results highlight that production-limiting (iceberg) diseases, such as OPA and Johne's disease, are common. Control of many diseases of adult sheep requires long-term flock health planning, rather than immediate action.

Worms were surprisingly common in ewes, with 4% of carcasses diagnosed across both years. Seventeen of the 21 cases were during February, March and April, suggesting a relaxation of immunity to parasites around lambing, if animals are not properly fed.

The project also highlighted that problems, such as dosing gun injuries, endocarditis and lung abscesses, were diagnosed, yet these are preventable. Producers need to adopt different techniques or refine their management to stop such losses.

From 2001 until 2008, as part of a Defra and industry-funded project called Longwool, around 1,800 mules were monitored through their productive lifetime. This produced a unique dataset of reasons why ewes left the flock (see Figure 6). It can be seen how reasons change as the ewes age.

**Figure 6: Percentages of Mule ewes culled/died by reason and age up to 1 January 2007 (percentage of total number in age group at beginning of year) for the Longwool project**

		Age of ewe culling/death (years)					
	Reason for culling/death	2	3	4	5	6	7+
	Total number of ewes	1803	1611	1392	1167	886	568
Culling	Teeth/mouth condition	0.2	0.4	3.4	10.0	22.1	18.3
	Udder condition	4.0	4.6	5.8	6.3	5.2	3.5
	Prolapse	0.7	0.6	0.6	1.2	0.9	0.5
	Foot/leg problems	1.3	1.4	1.0	1.0	1.1	0.2
	Other injury/abnormality	0.4	0.3	0.3	0.3	0.3	0.2
	Poor body condition	0.2	0.2	0.4	0.9	4.0	4.2
	Barren twice	0.0	1.5	0.4	0.4	0.8	0.7
	SUBTOTAL	6.9	9.0	11.9	21.1	34.4	27.6
Death	Pregnancy-associated	0.1	0.2	0.3	0.3	0.2	0.0
	Lambing-associated	1.0	1.5	0.9	0.6	0.3	0.5
	'Internal' sickness/disease	1.9	1.9	1.2	0.9	0.3	0.4
	Injury	0.3	0.2	0.1	0.0	0.0	0.0
	Unknown reason	0.4	0.4	1.0	0.8	0.2	0.4
	Gone missing	0.1	0.4	0.9	0.4	0.3	0.0
	SUBTOTAL	3.8	4.6	4.4	3.0	1.3	1.3
	TOTAL	10.7	13.6	16.3	23.1	35.7	28.9

The aim of the AHDB research project, Challenge Sheep, is to try to replicate these data over a range of flocks and breeds type. The main objective is to use known science to improve the lifetime performance of ewes.

### Ram mortality

As part of the Fallen Stock Collection Centre work, 75 tupes were examined and 38 different diagnoses were made. The top five causes of death were chronic suppurative pneumonia (8.2%), laryngeal chondritis (6.8%), acidosis (5.5%), Johnes' disease (5.5%) and redgut (4.1%). Each disease needs to be tackled in a different way.



SHAWG (the Sheep Health and Welfare Group) is an industry group that is funded by AHDB Beef & Lamb. The member organisations are working together to identify and prioritise sheep health and disease issues in the UK. They produced a report for 2016/17, which highlights the key health and welfare topics that affect sheep. For more information, see [www.shawg.org.uk](http://www.shawg.org.uk).

# Management of young sheep

Data from a four-year project looking at the impact of ewe BCS and weight on lamb performance, highlights that the rearing phase of replacement ewes affects their long-term productivity and longevity. Sheep that are lighter as ewe lambs need to grow more to achieve their target weights at first mating. If they do not, scanning percentage and lamb growth rates can be compromised.

The importance of managing shearlings is also being demonstrated in this project. Shearlings affected by disease also affects their BCS and scanning in the second breeding season. Lambs from shearling ewes also contribute a higher proportion of lambs that are light at eight weeks of age. Light is defined as being 17kg or below, when the flock average is 20kg. The reasons behind this require further research.

More projects are being carried out in New Zealand and England (Challenge Sheep) to look at the longer-term impact of replacements on flock productivity and profitability. See [beefandlamb.ahdb.org.uk](http://beefandlamb.ahdb.org.uk) for updates.

See Sheep Manual 4 - **Managing ewes for Better Returns** for the pros and cons of retaining versus breeding replacements.



## Top tips for managing ewe lambs

- Ewe lambs have lower fertility than mature ewes, but higher lifetime production if managed well
- Ewe lamb liveweight at mating should be 60% of mature bodyweight. For a 70kg mature ewe  $70 \times 0.60 = 42\text{kg}$
- Mate and manage ewe lambs separately from mature ewes
- Use mature rams when breeding ewe lambs
- Pregnancy scan to identify non-pregnant animals and litter size. Aim to achieve over 90% ewes in-lamb
- During early, mid-pregnancy and lactation, ewe lambs need 20% more energy than mature ewes to sustain continuing body growth, so prioritise ewe lambs during feed allocation
- Avoid over-feeding in late pregnancy as this could lead to lambing problems
- Ideally, ewe lambs should produce and rear one lamb
- Consider creep feeding lambs from ewe lambs to take pressure off the ewe while she is lactating
- If mating ewe lambs later than the main flock, consider weaning around ten weeks to allow sufficient time to recover prior to mating the following season

See BRP+ **Breeding from Ewe Lambs** and Manual 12 - **Improving ewe nutrition for Better Returns** at [beefandlamb.ahdb.org.uk](http://beefandlamb.ahdb.org.uk).

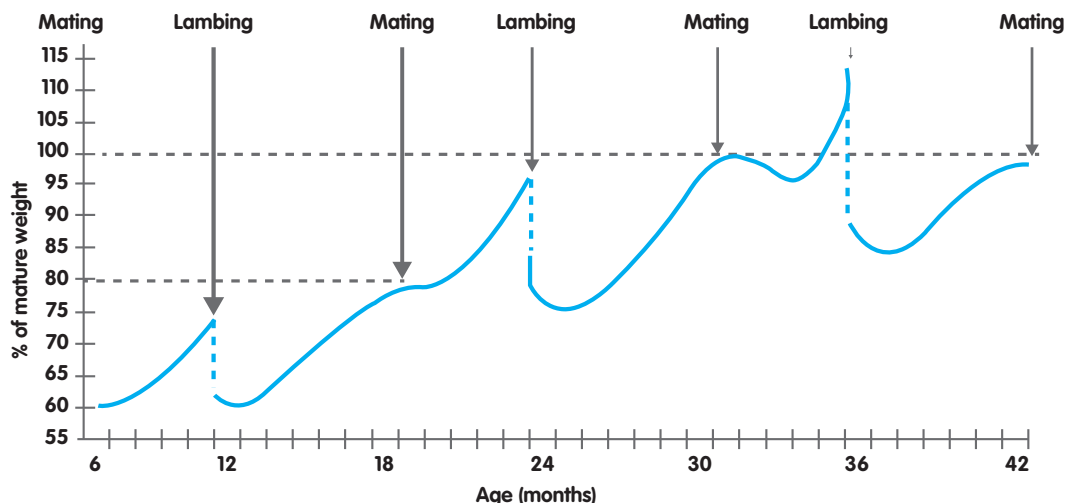
## First lactation

- Mammary tissue only develops when sheep are pregnant for the first time, irrespective of age. Breeding ewes for the first time as shearlings poses the same risks in terms of milk production and mastitis, as a ewe lamb. Consider feeding young ewes post-lambing, if grass quality or quantity is poor, to reduce the risk of mastitis in young ewes, especially if rearing twin lambs. See BRP+ **Understanding mastitis in sheep** at [beefandlamb.ahdb.org.uk](http://beefandlamb.ahdb.org.uk) for more information
- Research has shown that lambs can spend longer suckling from young ewes as milk production is lower. This increases the risk of damage, especially as the tissues are developing for the first time
- Data from the Longwool project shows that only 6% of ewes culled are two-year-olds. However, udder problems were the reason in nearly 60% of these ewes (see Figure 6)

Weight targets need to be followed when tupping ewe lambs and shearlings (see Figure 7). It is interesting to visualise the changes in weight and condition over time. Measuring weight, as well as BCS, is crucial in young sheep until they approach their mature size.

Shearlings should be 80% of the ewe's mature bodyweight at mating, irrespective of whether they were bred as ewe lambs, however, careful management is required to achieve this from ewe lambs mated. For example, for breeds with a mature size of 70kg, shearlings would need to be 56kg ( $70 \times 0.80$ ) at 18 months of age.

Figure 7: Weight targets (as a percentage of body weight) for young sheep



Source: SAC Consulting

Mature bodyweight is defined as the weight at three years or older. To understand specific weight targets for replacements, weigh a sample of mature ewes of a similar breed at around BCS 3 (for lowland type ewes) to derive an estimate of mature bodyweight.

# Monitoring performance

Monitoring flock and whole farm performance is important for the future success of a business. Not knowing costs and income can lead to farms losing money year-on-year, which is unsustainable. Each enterprise should be self-sufficient and profitable. If not, identifying the reasons why and actions that can be taken to reverse this, are essential.

Analysing flock performance is one key aspect. Knowing the flock costs is also important. Knowing the rearing percentage and average weight of the lambs at weaning is desirable, but knowing the income and margin on each lamb produced is essential.

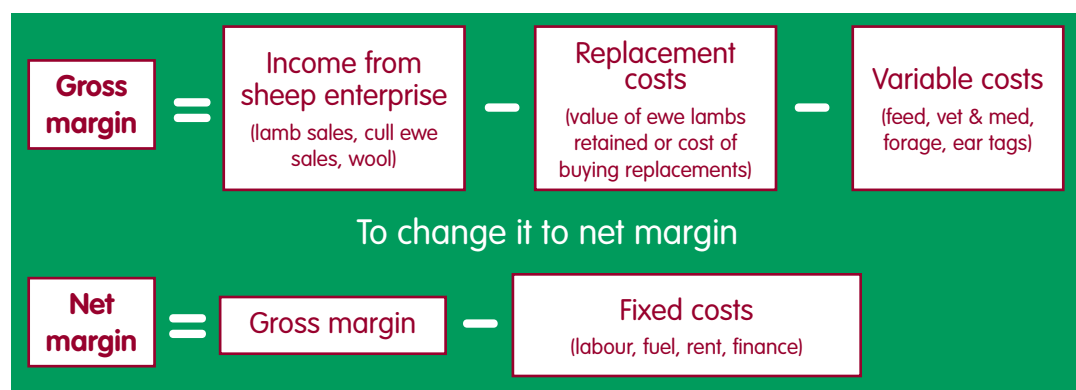


Stocktake Lite is a tool that enables farmers to enter their own production and variable costs to calculate the enterprise gross margin. This can be the first step, before moving to costing the enterprise down to net margin, which includes fixed costs. Comparing the business performance each year will enable

producers to monitor any changes they may make to the business and see the impact it is having.

The flock notebooks enable producers to record information while out and about, which can be transferred later to a computer. They have been designed to record everything needed to complete Stocktake Lite.

Comparing figures to farms of similar size and system, known as benchmarking, will also provide crucial information on where further amendments could be made. Benchmarking the business every year will help identify areas that require attention and help monitor changes that have been implemented. Benchmarking against similar businesses will also help drive the business forward. Identifying where other businesses are different is all part of the benchmarking process. Attending local discussion groups to compare performance is also invaluable.



AHDB have been working on a new costings programme called Farmbench which will enable producers to cost several enterprises across sectors to look at whole farm profitability (starting with beef, lamb, cereals, oilseeds and potatoes).

Enter your figures now at [www.farmbench.org.uk](http://www.farmbench.org.uk)

For more information, see **Assessing the business for Better Returns** manual at [beefandlamb.ahdb.org.uk](http://beefandlamb.ahdb.org.uk).

## Monitoring physical performance

Collate your figures using this table and use them with Stocktake Lite or in the key performance indicators tool (available at [beefandlamb.ahdb.org.uk](http://beefandlamb.ahdb.org.uk)) to get an understanding of your sheep enterprise.

Time of year	Data gathered	My farm	My targets for next year
Mating	Number of ewes put to the ram		
	Number of rams used		
Scanning	Number of lambs scanned in the ewes		
	Number of singles		
	Number of twins		
	Number of triplets and quads		
	Number of empty ewes at scanning		
Lambing	Start date of lambing (DD/MM/YYYY)		
	Number of lambs born alive		
	Number of lambs alive after 48 hours		
Weaning	Number of lambs at eight weeks		
	Average eight week weight (kg)		
	Number of lambs weaned		
	Average age of weaning (days)		
	Average lamb weaning weight (kg)		
Sales	Number of lambs sold finished		
	Average liveweight of lambs sold finished (kg)		
	Number of lambs sold as stores		
	Average liveweight of lambs sold as stores (kg)		
	Number of lambs retained for breeding or as stores		
	Average liveweight of lambs retained (kg)		
	Number of lambs sold for breeding		
	Average liveweight of lambs sold for breeding (kg)		
	Total number of lambs reared		
Ewe performance	Total liveweight of lambs reared (kg)		
	Total number of empty ewes throughout the season		
	Total number of ewe deaths		
	Total number of culled ewes		
	Total number of ewes sold for further breeding		
	Number of replacements bought or transferred		

## Health planning

Reminders when to carry out important management or veterinary jobs can be found on the flock management calendar tool. The online calendar allows producers to set up one or more flocks on the same account, based on lambing time/breed/system and to enter routine jobs that are required during the production year. Weekly reminders are sent via email to remind producers what actions are required during the next week.

For more information, see [www.flockcalendar.com](http://www.flockcalendar.com).

# Other BRP publications available

## Sheep BRP

- Manual 1 – Marketing prime lamb for Better Returns
- Manual 2 – Buying a recorded ram to generate Better Returns
- Manual 3 – Target lamb management for Better Returns
- Manual 4 – Managing ewes for Better Returns
- Manual 5 – Growing and finishing lambs for Better Returns
- Manual 6 – Target easier management for Better Returns
- Manual 7 – Reducing lameness for Better Returns
- Manual 8 – Worm control in sheep for Better Returns
- Manual 9 – Improving ewe breeding for Better Returns
- Manual 10 – Controlling external parasites for Better Returns
- Manual 11 – Ewe fertility for Better Returns
- Manual 12 – Improving ewe nutrition for Better Returns
- Manual 13 – Improving sheep handling for Better Returns
- Manual 14 – Reducing lamb losses for Better Returns

## Joint Beef and Sheep BRP

- Manual 1 – Improving pasture for Better Returns
- Manual 2 – Assessing businesses for Better Returns
- Manual 3 – Improving soils for Better Returns
- Manual 4 – Managing clover for Better Returns
- Manual 5 – Making grass silage for Better Returns
- Manual 6 – Using brassicas for Better Returns
- Manual 7 – Managing nutrients for Better Returns
- Manual 8 – Planning grazing strategies for Better Returns
- Manual 9 – Minimising carcase losses for Better Returns
- Manual 10 – Growing and feeding maize silage for Better Returns

See the AHDB Beef & Lamb website [beefandlamb.ahdb.org.uk](http://beefandlamb.ahdb.org.uk) for the full list of Better Returns Programme publications for beef and sheep producers.

## For more information contact: Better Returns Programme

AHDB Beef & Lamb  
Stoneleigh Park  
Kenilworth  
Warwickshire  
CV8 2TL

Tel: 024 7647 8834  
Email: [brp@ahdb.org.uk](mailto:brp@ahdb.org.uk)  
[beefandlamb.ahdb.org.uk](http://beefandlamb.ahdb.org.uk)

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