

Reducing lameness for Better Returns



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**Better Returns
Programme**

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Lameness presents a serious cost to the sheep industry. The estimated losses from footrot alone equate to about £10 a year for every ewe in Great Britain. If you take into account all the other causes of lameness, the total cost to the sector is staggering.

It may not be possible to eradicate lameness entirely, but producers who understand the condition and its many and varied causes, can reduce the physical and financial impacts of having lame animals on the farm.

There is no one 'magic' bullet to cure lameness. Farmers need to devise a strategy to suit their situation and employ a variety of management tools to reduce its effect on their flocks.

This updated manual describes in detail the different diseases that cause sheep to go lame. It then outlines a five-point plan to tackle them – including culling persistent offenders, quarantining all incomers and treating affected sheep appropriately.

Producers who take a systematic and determined approach to reducing lameness will reap rewards that will generate Better Returns.

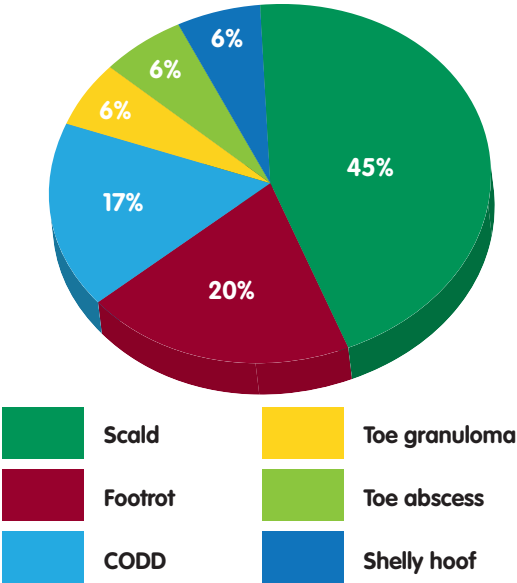


Katie Brian
BRP Project Manager

Counting the cost of lameness

Each year, footrot losses alone equate to £10 for every ewe in Britain. This figure was worked out from an on-farm study which showed the loss per ewe in the flock, based on production losses and treatment time. Losses from all causes of lameness will be far higher.

Figure 1: Reasons for lame sheep



Seriously affected sheep are easy to spot as they hobble or 'kneel'. However, even mild cases of footrot or contagious ovine digital dermatitis (CODD) are contagious. So early treatment is vital.

In addition to financial losses – through impaired performance, increased prevention and treatment cost, culling, etc – lameness also has animal welfare implications. Lameness may also affect single farm payments due to cross compliance failures (levels over 5%).



Set targets for better returns

The level of lameness varies in flocks across Great Britain according to season and management. Farmers who have comprehensively managed lameness achieve levels as low as 2%.

In 2011 the Farm Animal Welfare Council recommended that the level of lameness in flocks should be an average of 5% by 2016, and 2% by 2021 using currently available management practices.

Producers should identify the number of lame sheep within their flock now. This is the base level against which improvements can be measured.

Establish a treatment and prevention strategy and set an achievable target.

The healthy foot

A normal foot has a hard wall of horn around two toes, each with a softer sole horn at the base.

In healthy sheep, the interdigital skin between the toes is pale pink and dry with a layer of fine hairs.

The sole horn is only 2-3mm thick and easily damaged by thorns or other sharp objects. The wall horn bears the sheep's weight, so a normal foot has wall horn that is usually proud of the sole.

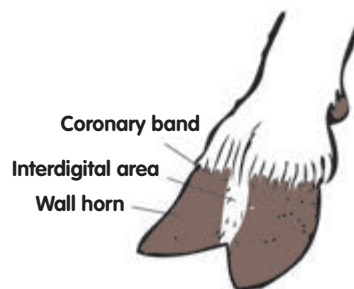
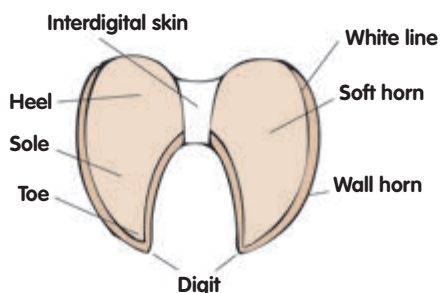
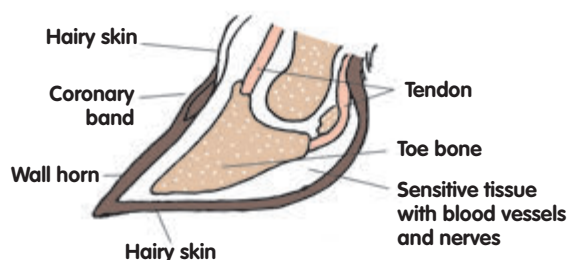
Sometimes this wall horn curls over the sole horn. This may not cause the sheep harm, but it has been common practice to trim this horn away. About 50% of farmers have stopped routine trimming and have seen fewer lame sheep.

Recent research has shown that foot trimming sheep lame with footrot or scald is detrimental, as it delays healing and increases the risk of footrot coming back.

Trimming may be needed where the hoof horn is deformed, but these sheep should be culled as soon as possible. If a diagnosis cannot be made without trimming, keep it to a minimum (see page 13 for best trimming practice).

Wall horn grows at about 5mm a month and the length of sheep feet varies naturally over the seasons. Over the course of a year, growth often matches wear so trimming is not necessary.

In a healthy foot the horn of both sole and wall is intact without smell, heat, softness or separated horn. If a sheep is not lame and its feet look reasonable – see diagrams – leave well alone.



There are six main causes of foot lameness in the GB sheep flock. Effective management of lameness depends on correct identification.

Scald

Footrot

CODD – Contagious ovine digital dermatitis

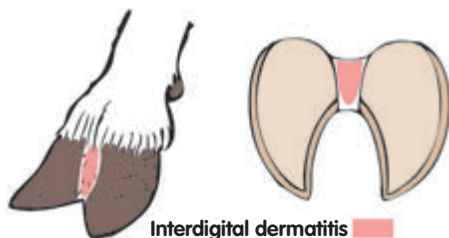
Toe granuloma

Toe abscess

Shelly hoof

Scald

Strip/interdigital dermatitis



Signs

Red/pink inflammation of skin between toes with white/grey pasty 'scum' on top. Can have a strong smell. Sheep can be very lame with only minor lesions.

Scald is early presentation of footrot.

Cause

Scald is caused by the bacterium *Dichelobacter nodosus* which also causes footrot. Infection occurs through damaged skin.

Damage can occur through:

- Abrasion, eg harsh or rough pastures, thorns, thistles, hedge trimmings or stubble
- Prolonged exposure to moisture, causing softening of the skin

Scald is more likely to occur when sheep are at high stocking densities, including when ewes are with lambs. Transmission is more likely if there are areas where sheep gather together, eg feed troughs, favoured areas of a field, housing.

Treatment

Where there is no footrot on the farm, treat individual ewes and lambs with antibiotic spray.

Where there is footrot on the farm treat adults with antibiotic injection and antibiotic spray.

Where incidence is high, footbath the group and move to pasture that has been sheep-free for two weeks, if this is possible.

Prevention

Farmers have found that controlling footrot in ewes reduces scald level in lambs.

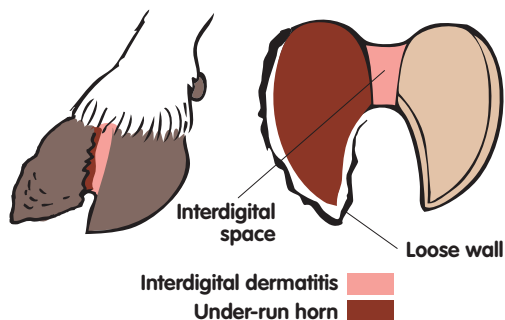
Regular footbathing can help prevent and control spring epidemics in lambs if done properly. Use a footbath as soon as lambs are large enough to go through. Ensure feet are as clean as possible before footbathing. Use the correct concentration of chemicals and stand the sheep in footbath for the correct length of time (see product label). Sheep must stand on a clean, dry, hard area after footbathing for 30 minutes for it to be effective.

Avoid putting lambs on areas heavily contaminated with faeces.

Reducing the amount and duration of handling events and improving underfoot conditions wherever possible can reduce the spread.

Apply hydrated builders' lime around creep feeders, water troughs and gateways.

Footrot



Signs

A grey, oozing pus with a distinctive foul smell.

A separation of hoof horn starting in the inter-digital space. Once established, the sole horn and outer wall horn may be under-run.

Cause

Footrot, like scald, is caused by the bacteria *Dichelobacter nodosus* which lives on sheep's feet.

The bacteria can survive for a couple of weeks on pasture. Infection is most likely to spread during warm, moist conditions in spring and autumn, although wet summers and mild winters may create a year-round problem.

Infection is particularly liable to spread in housed sheep where bedding is warm and stocking rates are high. It can spread from ewes to lambs during the summer months when it causes scald.



Treatment

When disease is seen, treat immediately:

- Give a long-acting antibiotic injection (discuss with the vet) for the correct weight of the animal. Do not underdose
- Apply antibiotic spray
- Do not foot trim
- Separate sheep where possible

Prevention

Good flock management will reduce the risk of further epidemics, implement the five-point plan:

- Do not select replacements from sheep with a history of lameness
- Cull sheep that have footrot more than twice
- Consider vaccination before high risk periods, eg housing
- Treat even mildly lame sheep as soon as possible (including ewes in late pregnancy)
- Avoid spreading infection, reduce the disease challenge via prompt treatment and/or separation of diseased animals
- Quarantine incoming sheep for at least 28 days and footbath on arrival

CODD

Contagious ovine digital dermatitis



Signs

A relatively recently identified infection which often results in severe lameness.

Initially occurs at the top of the hoof (coronary band).

Infection starts as a small ulcerated area at the coronary band. The infection progresses to under run the hoof horn capsule downwards towards the toe. The whole horn capsule may fall off.

There can be severe outbreaks of CODD whereby up to 50% of a flock may be affected – both adults and lambs. CODD infections may set lambs back for several weeks or months.

Mixed infections of both CODD and footrot are found on some farms.

Cause

While a number of bacteria can be isolated from infected hooves, it is thought that *Treponema* spp. bacteria are responsible for CODD.



Treatment

It is essential to seek veterinary advice for the latest recommendations as soon as CODD is suspected. Treatment options include:

- Injectable long-acting antibiotics and antibiotic spray (may require repeat treatment)

Do not trim as there is risk of damage to underlying tissues.

There is a strong link between footrot and CODD, therefore the implementation of the Five-point plan is also recommended to aid the control of CODD.

Prevention

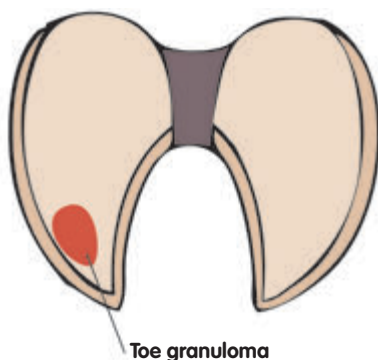
The greatest risk is posed by purchased sheep, which may not appear lame but can be carriers.

Check the vendor's flock history carefully and buy from flocks free from CODD.

Turn over and inspect the feet of all returning or bought-in sheep, as many sheep with early CODD lesions are not lame and can introduce disease.

Quarantine purchased and returning stock for at least 28 days. If possible keep separate longer.

Toe granuloma



Signs

The fleshy tissue, normally under the sole horn, grows out as a red pea-sized ball. This very sensitive tissue bleeds easily.

The wall horn is often overgrown and sheep may not bear weight.

Cause

Foot damage, especially that caused by excessive foot trimming, is the most common cause of toe granuloma. The fleshy 'strawberry' is a response to cutting into the sensitive tissue beneath the hoof horn.

It can also follow severe cases of footrot that have not been treated promptly.

Treatment

For the best treatment options, seek veterinary advice.

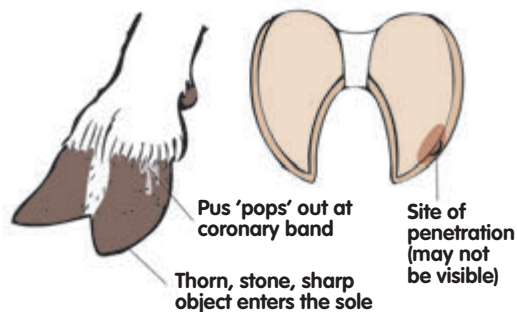
Use painkillers and antibiotics if there are signs of infection. Keep animals close to the farm to check regularly. It can be helpful to bandage the foot with copper sulphate.

Regrowth can occur after removal, so culling is the best option.

Prevention

Avoid trimming feet unless absolutely necessary and do not trim into the sensitive tissues that bleed.

Toe abscess



Signs

Pus may ooze from the coronary band and at the boundary between horn and skin. Can have a strong smell.

Affected hooves may be hot to the touch and painful before pus becomes visible.

Sheep will be very lame.

Cause

Puncture of the hoof, or separation of the white line, can lead to infection and abscess formation in the foot.

Treatment

Drain abscess and reduce pressure by paring just the sole as necessary.

Treat immediately with antibiotic injection and spray.

Prevention

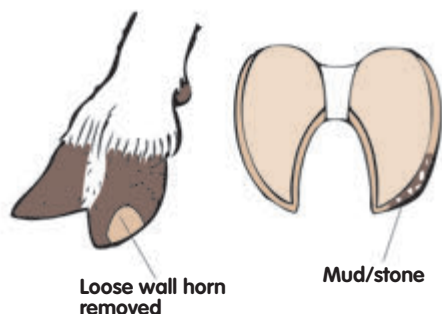
Keep stock away from areas which could cause foot damage, eg hedge trimmings and thistles wherever possible.

The white line is where the wall horn joins the sole horn. It is made up of a different type of horn which is particularly prone to separation. Two diseases may be seen when this separation occurs. One is toe abscess and the other shelly hoof.

A toe abscess occurs when infection gets into the white line, eg with a stone or thorn and an abscess then develops under the wall or sole horn.

In shelly hoof the wall horn comes away from the sole horn and the foot integrity is lost, but sheep are rarely lame.

Shelly hoof



Signs

The wall and toe horn separate to form a pocket. Sheep may not appear lame unless walking on impacted soil or hard ground. Shelly hoof will expose affected animals to secondary diseases.

Cause

The cause of shelly hoof has not been identified. However, there are suggestions that it is associated with damage from rough or wet ground, stony standings or nutritional imbalance.

Treatment

If lame, remove the loose horn flap and remove stones/thorns and treat as white line disease.

Prevention

There is no proven method of prevention.

Check that the mineral/vitamin balance in diet is correct and adjust accordingly.

Avoid walking sheep on stony or irregular ground.

Other causes of lameness

Certain other conditions occur from time to time in a flock. Such conditions may, or may not, cause a lame gait.

- Mis-shapen hoof
- Overgrown hoof
- Joint ill in lambs
- Post-dipping lameness
- Erysipelas arthritis

Always seek veterinary advice to be sure of a diagnoses and correct treatment.

Five-point plan

The five-point management plan gives farmers a clear strategy to control lameness on their farm and it is recommended where footrot, scald and/or CODD have been diagnosed as the cause of lameness.

These five actions should result in three outcomes for the flock:

- Increased natural resilience to the diseases that cause lameness
- Reduced disease challenge on the farm
- Improved immunity via vaccination



By implementing all five points in the plan together, farmers can tackle the disease from all angles giving their flock the best chance of staying clear of lameness problems.

1 Cull – Build resilience

Lame ewes spread disease to other ewes and lambs.

Sheep that have suffered severe or repeated bouts of lameness can develop chronically infected and misshapen feet. These animals act as a constant source of infection, making other control measures ineffective. They should be removed from the flock.

It can be difficult to cull apparently productive ewes. However, culling hard in the first year will boost overall resilience levels in the flock and reduce the amount of disease that is spread.



ACTION – Identify repeat offenders, use cull tags or EID. Be tough – two strikes in one season and then cull.

2 Quarantine – Reduce disease challenge

When purchasing ewes, rams or replacements, ensure their health status is known. Even the finest pen of animals might bring new infection to the farm that could threaten existing stock. A sound biosecurity programme can minimise the risk.

Any sheep brought onto the holding that has at any time been in contact with other sheep needs to be quarantined (even if returning from a show), to prevent the introduction of different strains of footrot and CODD. Any brought in sheep must be considered at risk and should be quarantined for a minimum of 28 days. Ideally check every sheep to look for early signs of footrot or CODD. Treat clinical cases quickly. The sheep should be footbathed every five days on three occasions, in either 10% zinc sulphate or 3% formalin. At the same time observe carefully for signs of other diseases.

Do not accept stock which are lame or with chronically misshapen feet.

Ideally purchase all replacements from an individual flock and transport directly from origin to the new premises. This prevents other diseases being picked up. Ensure the transport is properly cleansed and disinfected. Avoid sharing transport and mixing stock from different sources. Where possible move sheep in the farm's own transport.

When treating lame sheep in the flock, whenever possible segregate out the lame animals to prevent spread between the flock and keep separate until fully recovered.

ACTION – Only buy from sources that take a pro-active approach to tackling lameness. Decide on a quarantine procedure with the vet and stick to it.



3 Treat – Reduce disease challenge

Disease spreads quickly so treat even mildly lame sheep as soon as possible. Rapid treatment helps stop the cycle of infection.

- **Catch** – within three days of becoming lame
- **Inspect** – clean away dirt but do not trim hoof horn
- **Diagnose** – identify correct cause. Seek advice from the vet if not sure
- **Treat** – see decision tree (on page 17) for treatment options
- **Mark** – affected limb and record tag number
- **Cull** – repeat offenders or run lame sheep in a separate group



When treating animals, ensure the right antibiotic is given for the disease and the correct dose. Discuss this with the vet.

ACTION – Look for all lameness, not just the worst cases. Act quickly to treat.

Antibiotic injections

A high dose of long-acting antibiotic is the most efficient treatment for scald in adults, footrot, CODD and toe abscesses.

Typically long-acting intramuscular oxytetracycline or amoxicillin can be used against footrot. For CODD long-acting intramuscular amoxicillin is advised. For most oxytetracycline-based products, no more than 5ml should be given at any one site.

These injections can provide cure rates of 70-90%. Therefore some sheep will require repeat injections. Discuss the best option for the flock with the vet. It is important not to under-dose. Discuss dosage rates with the vet. Weigh the animals and give the correct dose rate.

If these products are not effective, there could be a number of reasons for this. Contact the vet for further advice.

Foot sprays

An oxytetracycline-based aerosol will aid treatment by killing surface bacteria. This will also reduce the spread of footrot to other sheep in the flock. Spray all four feet, as there will be an increased number of bacteria on the healthy feet as well as the diseased feet.

Ensure area to be sprayed is clean. Spray for at least five seconds, or until lesion is adequately covered. Ensure sprayed area has dried before releasing sheep. Where possible, allow treated sheep to stand on dry ground for a minimum of 30 minutes before returning to pasture.



Foot trimming

Do not trim sound feet; horn will break away naturally.
Do not trim for cosmetic reasons.

If trimming is required:

- Leave a wall edge 2-3mm proud of the sole
- Only trim away loose horn that may allow mud to impact on the foot
- Do NOT trim to blood
- Disinfect clippers between feet, use sharp instruments and replace regularly
- Collect and dispose of trimmed hoof

Issue	Trim Yes/No
Routine trimming	No
Infected with footrot	No
CODD	No
Shelly hoof	Yes
Overgrown	*

*Only if impeding walking

Footbaths

Footbathing can help treat and prevent scald, but is not effective in treating footrot or CODD. Always footbath sheep after routine gathering.

It is important to:

- Plan footbathing
- Check equipment is in good order and the sheep's feet are clean
- Use solutions at concentrations and stand-in time recommended by the manufacturers – read the label
- Stand sheep on a clean, dry and hard area for a minimum of 30 minutes after footbathing
- Turn sheep onto a clean, dry field (ideally that has been sheep-free for at least two weeks) afterwards



4

Avoid – Reduce disease challenge

Avoid spreading infection during handling, gathering and when the sheep are out in the field. Bacteria spread easily in wet, soiled handling areas and in muddy fields.

Improve under-foot conditions in any poached areas or where there is heavy traffic. Spread gravel, woodchips or lime.

Upgrade and clean up permanent handling areas and tracks, or consider mobile handling systems.

ACTION – Think carefully every time sheep are handled or moved. Does handling make the problem worse? What can be done to improve the management system?



Handling systems

Good handling systems are important to prevent and manage lameness. The aim should be to avoid damage to feet by using hard ground, without stones.

Portable handling systems offer the advantage of not gathering all sheep in the same place – which avoids the whole flock being exposed to one contaminated area.

Wherever sheep are gathered, minimise the amount of time they are standing in collecting areas. Footbath afterwards observing product recommendations.



Breeding

- Do not breed or buy replacements from sheep that have had scald or footrot
- Susceptibility to footrot can be inherited, so consider genetic indicators for resistance when available

Grazing management

- Aim to minimise the build-up of bacteria by rotating stock or maintaining low stocking densities. Footrot bacteria live on pasture for approximately 14 days
- After whole-flock footbathing, move the animals to a field that has ideally been sheep-free for at least two weeks
- Keep a 'spare' field to separate treated lame sheep
- Place water troughs in well-drained areas and avoid spillage
- Move feed troughs, creep feeders and forage racks regularly to avoid poaching and faecal contamination
- Avoid excessive use of gateways. Consider using hydrated builders' lime in heavily used areas



Housing management

Warm damp housing provides ideal conditions for bacteria to thrive.

At housing

- When bringing the flock in, sheep with footrot, scald or CODD should be treated and housed in a separate pen
- Footbath remaining sound sheep and house away from lame sheep

During the housed period

- Ensure dry bedding throughout the housing period – especially around feed and water points
- Move any sheep with scald, footrot or CODD to a separate pen immediately and treat promptly
- Consider using hydrated builders' lime around troughs and feed barriers



5 Vaccinate – Establish immunity

There is a licensed vaccine available that can be used to treat and prevent footrot. The best results are achieved with a whole-flock vaccination programme (including rams).

The vaccination should be timed to coincide with high-risk times on the farm.

Vaccination protocols can differ, depending on the challenge, discuss with the vet. One way is to use a single-dose primary course, followed by six monthly boosters. Some farms may benefit from a two-dose primary course.



Read the product data sheet very carefully before using the vaccine.

Wear gloves when vaccinating and use a safety vaccinator to avoid self-injection, as the vaccine is hazardous to humans.

Sheep that have, or will be given footrot vaccine, should not receive 1% moxidectin. Discuss in more detail with the vet.

ACTION – Decide with the vet if and when to vaccinate. Common times are at housing or after shearing.

Managing individual lame sheep

- Catch lame sheep within three days and examine legs and feet
- Check legs carefully for swelling, heat or pain
- Check feet for smell of footrot or scald, early CODD and heat

Where lesions are not obvious:

- Check for thorns, mud, skin damage between toes or granulomas, ideally treat without hoof trimming
- Check for lesions. If diagnosis is not possible, carefully trim away the horn. Do not cause bleeding
- Feel for heat in the joints or feet – this indicates infection. A foot abscess may need draining by careful paring of hoof horn to allow pus to drain out. Always give an antibiotic injection and spray foot after treatment





DECISION TREE FOR LAMENESS



TREATMENT:

- Antibiotic injection and spray
- Do not trim
- Mark leg
- Footbath if large numbers of lambs with scald

YES

Is it scald or footrot?

NO



Red/pink area between toes with white/grey pasty scum.



Pus, foul smell and separation of hoof horn.

TREATMENT:

- Consult the vet for advice
- Antibiotic injection and spray (may need repeat treatment)

YES

Is it CODD?

NO



A red raw lesion that starts at the top of the hoof which typically leads to hoof separation and detachment. May smell.

TREATMENT:

- Consult the vet for advice
- Use painkillers
- Use antibiotics if signs of infection
- Keep animal close to the farm to check regularly
- Cull if no response
- Can be helpful to bandage foot with copper sulphate

YES

Is it toe granuloma?

NO



Fleshy, strawberry-like tissue often caused by foot damage, especially over-trimming.

TREATMENT:

- Carefully trim the sole as necessary to drain the abscess and reduce pressure
- Use antibiotics

YES

Is it an abscess or white line disease?

NO



Penetration of white line may not be visible. Pus appears at coronary band, foot can be hot and painful.

TREATMENT:

- If lame, trim loose horn

YES

Is it shelly hoof?

NO



Separation of toe and wall horn with no smell. May not cause lameness.



For other causes of lameness consult the vet for advice on treatment

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 – Target 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 the business 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 for the full list of Better Returns Programme publications for beef and sheep producers.

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