



Hybu Cig Cymru
Meat Promotion Wales

Sheep health

Maximising your flock's potential
through improved health



About HCC

Hybu Cig Cymru - Meat Promotion Wales (HCC) is the organisation responsible for the development, promotion and marketing of Welsh red meat. We work with all sectors of the Welsh red meat industry - from the farmers through to the retailers, to develop the industry itself as well as develop profitable markets for Welsh Lamb, Welsh Beef and pork from Wales.

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

The Industry Development team undertake a range of activities that include:

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

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Foreword

Achieving top performance from your sheep, both for commercial producers as well as pedigree breeders is essential to maintaining a profitable flock. To achieve this top performance the health and welfare of the flock is paramount. A well fed, well managed flock with good health security goes a long way towards achieving good profitability. This booklet aims to provide producers with information and advice about the major threats to the health and welfare of their flocks. It also indicates the necessity to have a robust flock health plan in place which should be regularly updated with your vet.

The original Sheep Health booklet was published by HCC in 2009. This updated version includes the latest advice based on scientific research and also includes new and emerging diseases that were not present in 2009. The articles have been written with a practical bias towards early recognition of disease but above all on how to prevent the introduction of disease and conditions which will lead to reduced performance and hence loss of profitability. The articles are relevant both to pedigree breeders where individual sheep are important as well as the large extensive commercial producer whose concern should be the individuals but within the flock context.



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Flock Health Planning

Introduction

A flock health plan is a useful tool to enable farmers to plan routine treatments within their flock. It can be used to set targets and monitor the performance of the flock in relation to health. Ideally it should be prepared with your vet and is an invaluable farmer/vet interaction.

Whilst it may appear costly to draw up plans with your vet it is cost effective.

Remember that health programmes do not just focus on disease and health but also include nutrition and pasture management. A well fed flock has a head start on all others.

It is true that healthy sheep are profitable sheep. Flock health planning aims to prevent disease as well as making the enterprise as profitable as possible.

Basic requirements for a successful plan are:

- records
- a concise assessment of recent problems
- and a clear set of achievable objectives.

Making a start

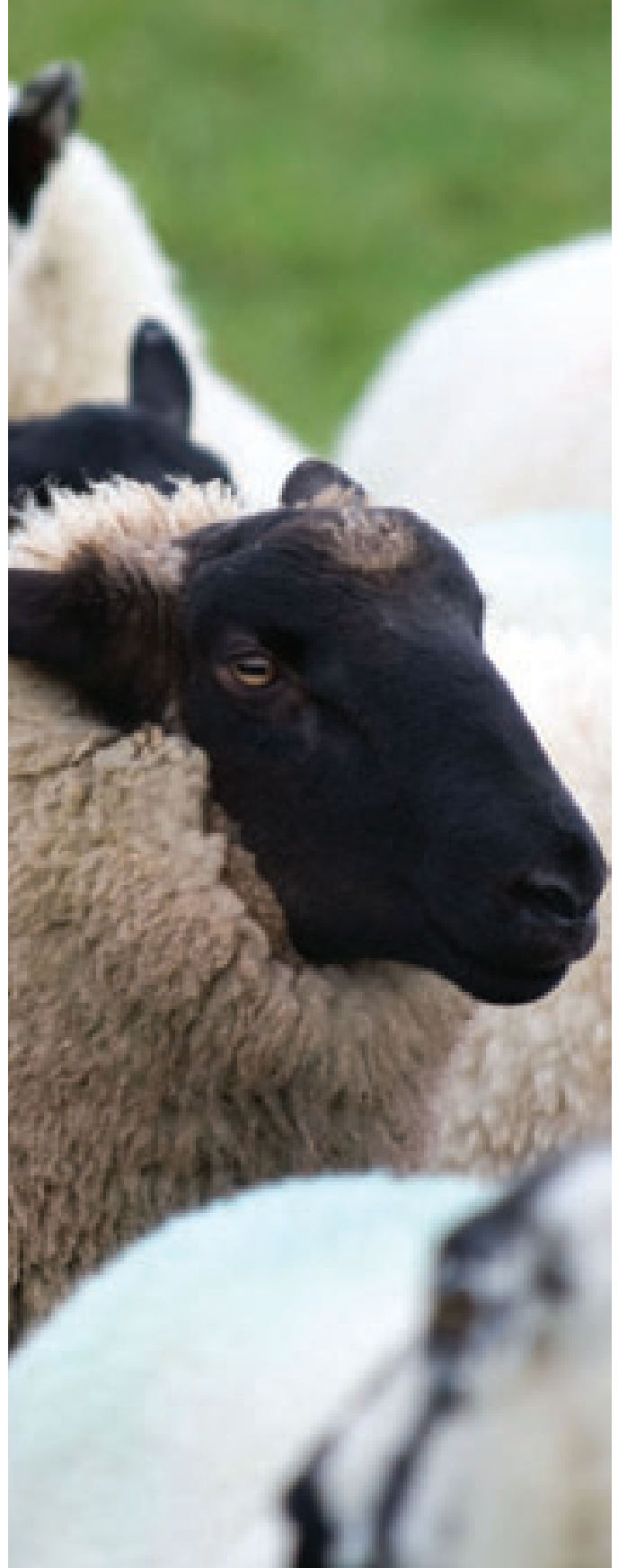
Initiation of a flock health plan is best carried out eight to six weeks before rams and ewes are joined. The actual time of year will depend on the flock's chosen lambing date. Whilst preferable to initiate a plan at the beginning of the sheep year a good alternative is during the six weeks from the end of lambing.

Flock records

Records are key to a successful plan which will increase flock profitability on an annual basis. These need not be complex or time consuming. The basic requirements are:

- projected lamb crop at scanning and lambs finally sold
- losses of pregnant ewes, barren ewes (differentiate between true barren and those who lambed but were turned out without a lamb)
- lamb losses at birth and in next seven days, losses from seven days of age to end of selling period

Whilst lambing is always a very hectic period a simple notebook and pencil to record losses is invaluable in planning for better lambing performances in the future.



Constructing the plan

The flock health plan does not need to be a massive document. Some of the very best are based on the diary system whereby the proposed actions are pencilled in and on completion are ticked off.

The following topics are examples of what should be included in your health plan. Discuss with your adviser general management as well as specific preventative medication and vaccine usage.

Pre-tupping

Rams:

- Fertility and condition score
- Are raddles to be used?
- Ram to ewe ratio
- Trace element status

Ewes:

- Final check of teeth, udders and mouths, if in doubt about any aspect – cull
- Condition score and trace element status
- Vaccination against abortion. If it is decided that this is necessary it must be completed 4 weeks (Enzootic abortion vaccine) or 3 weeks (Toxoplasma abortion vaccine) before joining with the ram
- Decide how many cycles rams will be allowed. A tight lambing is advantageous to both the well being of the flock and to the shepherd

Post-tupping

Removal of rams:

- After tupping keep rams in good condition to reduce future replacement costs

Ewes, third month of pregnancy:

- Scan to determine how ewes should be fed
- Check copper status

In most Welsh flocks dosing against liver fluke will be necessary in October and January but more treatments may be necessary when incidence is high. Accurate advice on appropriate strategies should be sought from your vet.

Prelambing

- Decide on supplementary feeding regime
- Analysis of home grown fodder is recommended
- Condition score ewes regularly
- Adjust feeding by groups either by age, by foetal load, or preferably by condition score
- Vaccination - pre lambing booster vaccination against clostridial disease should be mandatory and a risk assessment as to the pasteurilla threat made and appropriate vaccines used
- Prelambing vaccination against orf (if to be used) must be completed at least seven weeks before due lambing date and at least seven weeks before housing
- In larger flocks make early arrangements for lambing time assistance



Lambing

- Record deaths and abortions
- Carry out routine procedures such as navel dressing
- If appropriate, vaccinate lambs against orf
- If lambing indoors, turn ewes out in small numbers into sheltered paddocks to minimise mis-mothering
- Decide on castration and tailing policy

Immediate post lambing

- Aborted and barren ewes should be isolated
- Take veterinary advice about worming all ewes at this time
- Plan for evasive action against *Nematodirus battus*, by not using fields used by lambs preferably in the last two years

Lambs 3-6 weeks of age

- If coccidiosis is a problem preventative dosing of lambs should be considered before the risk period which is usually 4-8 weeks of age

Lambs at six to eight weeks

- At this stage lambs require their first dose of clostridial vaccine with or without a pasteurella component, the latter depends upon a risk assessment
- Consider the risk of disease due to *Nematodirus battus* and treat if necessary, remembering that no treatment is persistent against this parasite

Late Spring - Summer

- Lameness, worm control and parasite control need to be addressed
- Replacement policy to be reviewed and a decision made on the number required and also the source

History of farm problems

Into this plan add any specific preventative treatments necessary based on past problems such as trace element supplementation in flocks afflicted with white muscle disease, or confirmed cobalt deficiency.

The above is a broad outline of the subjects requiring discussion during the formation of a flock health plan. Each individual flock requires a plan that is specific to itself to allow for variations in management, terrain, organic status or not, disease present in the flock and breeding objectives.

The plan must be updated at least annually to take account of disease threats identified during the previous twelve months.



Key steps to flock health planning

Flock health planning can and does make a huge impact on both flock profitability as well as welfare and owner/shepherd satisfaction

- Flock health planning has been proven to increase profitability
- It is a living document that must be regularly reviewed
- It must be based on each flock's individual requirements
- It must cover disease, nutrition and pasture management

Flock Security (biosecurity)

Flock health security is an important aspect to maintaining or improving the profitability of a flock. In the lowland situation ring fencing to prevent sheep either wandering out or neighbours' sheep wandering in is important. Ideally double fencing should be used where adjoining other sheep farmers. External gates should be padlocked to avoid rustling but also to stop well meaning strangers from finding neighbours' sheep on the road and mixing them in with your sheep.

Areas of open hill and common land can present challenges to managing the health status of the flocks that graze there and good co-operation between graziers is required.

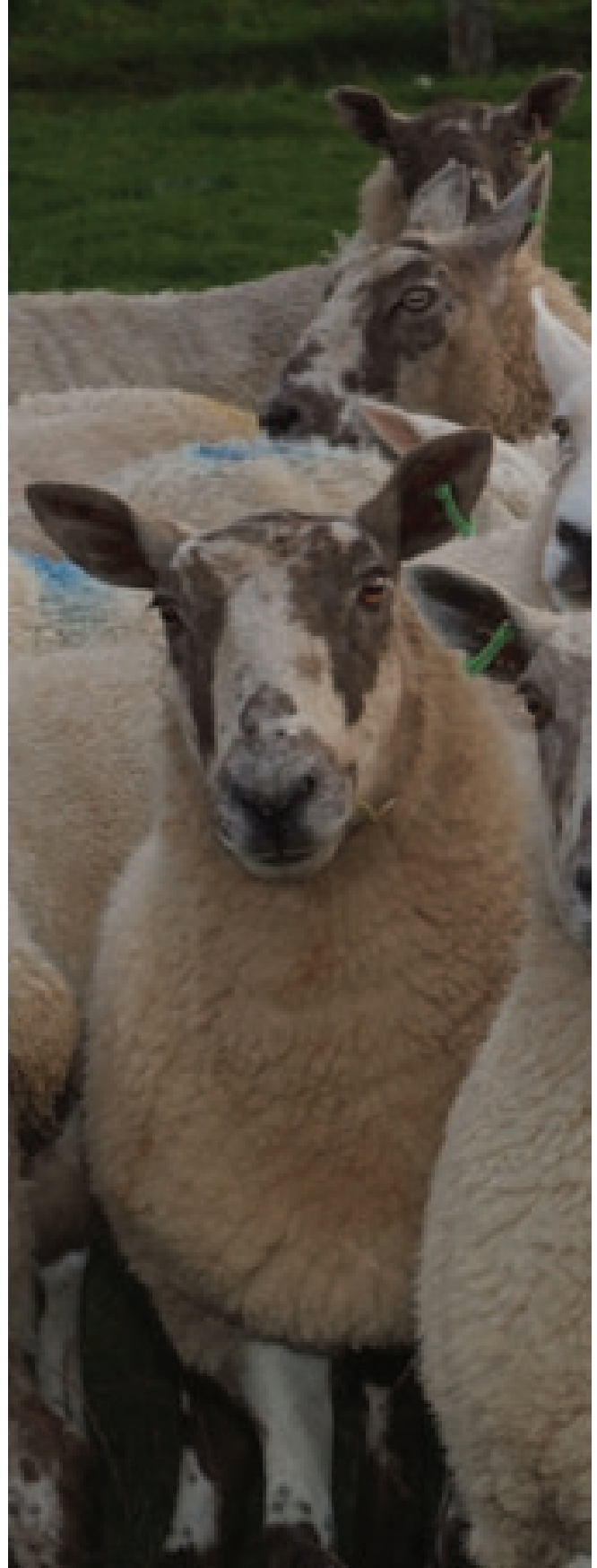
The biggest risk to the flock is the buying in of replacement breeding stock including rams either by private sales or through a market.

The best looking group of animals could well be carrying disease which is not apparent at sale time but will emerge in the days and weeks after the sheep have joined the new flock.

Costly examples of diseases that can enter a flock this way include;

- sheep scab
- resistant round worms and liver fluke
- footrot
- contagious ovine digital dermatitis (CODD)
- enzootic abortion

In addition ovine pulmonary adenocarcinoma (Jaagsiekte) and Johnes disease are present amongst Welsh flocks and the only control strategy is to cull infected animals.





Any sheep moving onto a farm, whether a single ram or a group of replacement ewes, must be quarantined for a minimum of 21 days. Good quarantine practices will help to prevent many of these diseases entering your flock.

- 1) All oncoming sheep have the potential to carry resistant internal parasites (worms) which are resistant to one or more of the common treatments. The aim of quarantine treatment is to remove resistant worms by using the most effective treatments to which resistance is unlikely. New classes of anthelmintics are now available. Take advice from your vet or adviser. Details are also found on SCOPS website www.scops.org.uk
- 2) Sheep coming onto a property from whatever source may be infected with scab mites – dip using an OP dip (not within 14 days of giving levamisole) or if using injectable moxidectin this injection can be done sequentially as part of the quarantine wormer treatment (see www.scops.org.uk).
- 3) Yard for 24 to 48 hours and then turn onto pasture that will contain worms to dilute any surviving worm eggs passed by the incoming sheep.
- 4) Get advice on quarantine procedures for liver fluke and consider the possibility of liver fluke resistant to flukicides. Treatment will also depend on the liver fluke situation on your own farm.
- 5) Although sound at the time of purchase sheep can carry the bacteria that cause footrot and CODD – footbathing in 2.5-3% formalin or 10% zinc sulphate will reduce the bacteria causing infection but not eliminate them from infected feet so examine all feet if possible. Alternatively antibiotics specific to the bacteria can be used but those effective against CODD can only be administered by a vet.
- 6) Enzootic abortion (EAE) can be introduced by latently infected ewes and also by ewes that have previously aborted due to EAE. Latently infected ewes will abort at the subsequent lambing; previously infected ewes may have a 'normal' lambing but still spread infection in placenta and discharges. Vaccination of incoming stock will reduce but not prevent spread of infection from latently infected ewes.
- 7) Look carefully for swollen glands around the head and neck which could be due to caseous lymphadenitis (CLA). The stress of sale could also induce clinical signs of orf so keep a close watch on the animals during the 21 day quarantine period.
- 8) If any animals appear to be ill, or losing condition during this quarantine period it is essential to have them examined by a vet, before introduction to the home flock.

If you are using any other vaccines in your flock speak to your vet about whether it is an appropriate time to administer them to the incoming stock to bring everything up to the same vaccination status.

Flock security is an integral part of flock health planning and the various options outlined above must be incorporated into the plan.

Remember that incoming sheep are not the only threat to flock security. Sheep scab mites can survive off the host for over 16 days. Anybody having contact with infested sheep (shearers, other contractors, vets) must disinfect their protective clothing and wash exposed areas of skin with water (as hot as bearable) before leaving the premises.

Rigorous hygiene and disinfection of vehicles and equipment, especially of shearing equipment, is recommended to prevent the introduction of infections like CLA.

Planning for healthy sheep

Clostridial Disease

Clostridial diseases are deadly

There are ten clostridial diseases which can affect sheep. The commonest in Wales are pulpy kidney, lamb dysentery and black disease. The other seven are more sporadic but kill a significant number of sheep every year.

The clostridial bacteria can either exist in small numbers in the various organs of the sheep or form spores which survive in soil for many years. Trigger factors, which vary for each species, set off rapid multiplication.

During this multiplication powerful toxins are released which rapidly destroy the sheep's internal organs. The result is rapid death.

Once symptoms are observed too much damage has been done and despite any treatment death is inevitable. Fortunately very efficient vaccines are available to prevent sheep dying from a clostridial infection but correct use of these vaccines are required to get good protection.

All sheep require a primary course of two injections 4-6 weeks apart. An annual booster vaccine will then be required and is usually done 4-6 weeks before lambing. The ewe will then pass antibodies to her lambs via the colostrum giving the lambs protection for a short period in early life.

Ewe lambs to be kept for breeding and that will be tupped as shearlings should have their primary course of two injections before they are weaned. They should then be included with the rest of the ewes to receive their annual boosters. It is a common mistake for shearlings to be missed and not receive their first annual booster making them vulnerable to infection.

Lambs destined for slaughter may require protection against clostridial diseases and will require two doses; the first at approximately 8-10 weeks of age and the second 4-6 weeks later.

Remember to include tups and ram lambs in all vaccination programmes.

Orf

Orf is an enigma causing serious problems on some farms but not others.

Orf is caused by a parapox virus which requires a micro-abrasion to infect the tissues immediately under the skin. Disease is seen in very young lambs, grazing weaned lambs, ewes and on ewes' teats. Frequently there is a secondary infection of the lesions with a staphylococcal



Lamb orf

bacteria. Some farms experience an outbreak but do nothing and the disease does not re-appear, whilst other farms suffer problems every year.

A live vaccine derived from mild strains of field virus is available. The objective is to give the animal a mild dose of the disease so that it will acquire immunity. If orf is not present on your farm do not use this vaccine.

Depending on which class of sheep is affected then appropriate vaccination schedules need to be developed.

- Ewes should not be vaccinated later than seven weeks before lambing or housing
- Lambs can be vaccinated from one day of age
- Vaccinate ewes and lambs, there is no colostrum protection
- The vaccine should be applied under the foreleg in all animals, not in the groin as the lamb can lick that area and infect its mouth

Vaccination when an outbreak occurs in grazing lambs can reduce the severity and number infected. Other factors in the control of orf:

- Secondary bacterial infection is best controlled by antibiotics
- The virus can survive for over a year in scabs that have dropped off in dry places but this is reduced in wet conditions. Thus if an outbreak has occurred in housed sheep the shed and all equipment should be washed down with plenty of water and disinfectant
- Pasture rich in thistles or gorse are a real hazard as they damage the lips allowing virus entry. Thistle control should therefore be part of your farm management plan

Orf is such an enigma that it is important that you consult your vet as to the best approach to control in your situation.



Pneumonia - Pasteurellosis

Pasteurellosis causes pneumonia in adults and lambs.

It can also cause a septicaemia particularly in weaned finishing lambs in the autumn.

The vast majority of sheep carry the pasteurella bacterium in their tonsils. Recently the names of the bacteria have been changed, those causing pneumonia are now called Mannheimia species, usually *Mannheimia haemolytica* and those causing septicaemia are now called *Bibersteinia trehalosi*.

Disease is initiated either by management or environmental stress, such as dipping or sudden change of pasture. But deaths can also be caused by pasteurellosis when other pneumonic agents are present such as *Mycoplasma spp*, Ovine Pulmonary Adenocarcinoma or parainfluenza virus. In these cases the lungs are damaged and the opportunist pasteurella bacteria present in the tonsils pass down the trachea to cause a fatal pneumonia.

Diagnosis of pneumonia is straight-forward but it is important to differentiate between primary pasteurellosis and disease in which other agents play a part.

Vaccines are available against pasteurellosis and are efficient in protecting against primary infections; they may be less effective against secondary disease.

The vaccines, like those for clostridial diseases, are inactivated and require two doses to establish any immunity. Flocks may not suffer a pasteurella problem and a decision on whether vaccination is necessary can be based on a risk assessment during flock health planning.

Some protection is passed to the lamb via the colostrum, as for the clostridial diseases, but only provides protection for three to four weeks. Timing of vaccination depends upon the risk period and the previous history of outbreaks.

Well established combined clostridial / pasteurella vaccines are available. Their use should be planned and discussed with your vet during flock health planning.

Parasitic Roundworms

Roundworms can cause significant production losses and even death in sheep

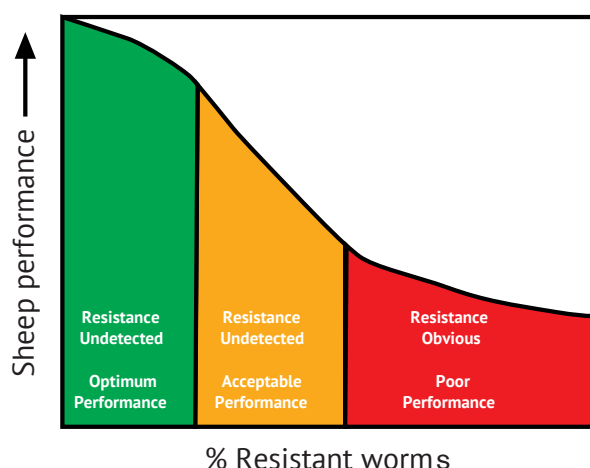
Resistance to three anthelmintic groups has been found in Wales which means dosing with some products will be ineffective

The SCOPS (Sustainable Control of Parasites in Sheep) guidelines should be followed www.scops.org.uk

For nearly 40 years we have been able to control worms very successfully using regular treatments with highly effective anthelmintics. There is an increasing level of resistance to these products in the worm population. It is not too late for most producers to take action and slow anthelmintic resistance down. The development of resistance is a gradual process and the earlier you act the longer you can keep wormers effective.

The diagram below illustrates lamb performance against % resistant worms on the farm. When we test for resistance, for example by using a Faecal Egg Count (FEC) at a set time after drenching, we are looking for the wormer to have killed at least 95% of the worms. In the diagram this is the point where the green and amber zones meet. The important message is that in practice, without a test, you wouldn't notice a fall in sheep performance until 80% or less of the worms were killed. By then you will have entered the red zone from which there is no way back.

Stay out of the red!



Act Now

Adopt the SCOPS guidelines to maintain effective wormers

The objective of sustainable worm control is to work to keep your farm in the green / amber zone for as long as possible. The challenge is to try and balance effective worm control which will ensure sheep performance and welfare while at the same time, minimising selection for resistance to the anthelmintics in the worm population.

What Can We Do?

You need to know whether any of the worms present on your farm have developed resistance to any of the anthelmintic groups. A simple FEC test before and after drenching will get you started. Your vet or livestock adviser can then advise you on how to use this information so you are in a good position to make decisions on future worming policies.

Key steps to control of internal parasites

Avoid bringing in resistant worms - use quarantine treatments.

Test for wormer resistance on your farm.

Use the right dose of the right wormer at the right time. (Don't guess the weight of the animals).

Only use wormers when necessary - use faecal egg counts to check when ewes and lambs require drenching.

Do not routinely dose ewes pre-tupping, focus on lean, immature or infected ewes.

Dosing ewes post lambing may be required but requires strategic planning – seek advice from your vet or livestock adviser.

Preserve susceptible worms on the farm and reduce the selection for wormer resistance.

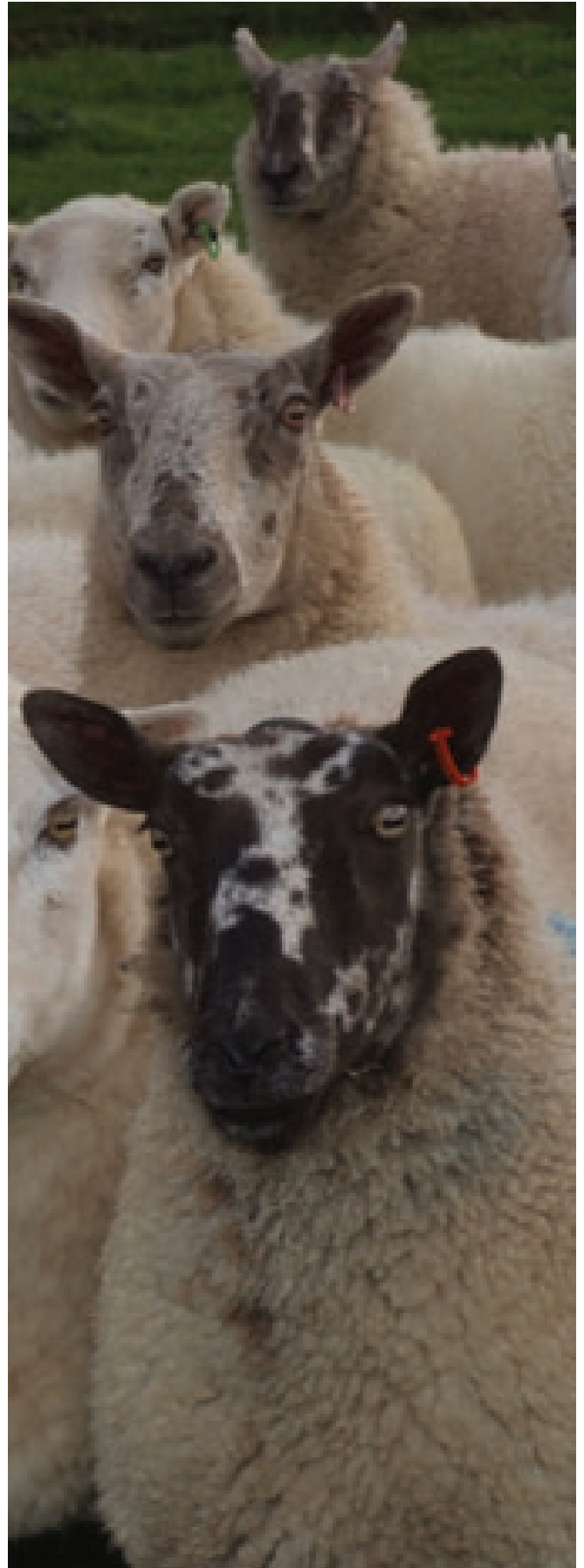
Use mixed grazing with cattle (but not goats).

Move weaned lambs on to less contaminated areas from late June onwards.

Work out a control strategy with your vet or livestock adviser.

For more information

consult your vet and refer to the advice from SCOPS which can be found at www.scops.org.uk



Liver Fluke

Liver fluke causes substantial economic losses through death, ill thrift and condemnation of livers in abattoirs.

Liver fluke predisposes to other diseases such as black disease.

The incidence of liver fluke has increased greatly over the last few years, with it occurring in areas previously thought to be 'fluke free'. Essential to this spread and increased severity are wet summers.

Eggs are shed from sheep and cattle on to the pasture. On the pasture they develop and seek out a mud snail, *Galba truncatula*, where multiplication occurs and the life cycle continues. Finally vast numbers of the infective stage escape from the snail onto the pasture where they encyst on herbage.

When eaten by cattle and sheep they migrate to the liver where they develop into adults. They do not start to lay eggs until they are about ten to twelve weeks old. The full life cycle usually takes about four to five months. In sheep fluke causes three distinct types of disease but with frequent overlap between types.

Acute fluke

Acute fluke occurs when large numbers of the infective stage are ingested at once, resulting in massive damage to the liver with haemorrhage and tissue damage. In these cases severely affected animals frequently die. Examination of the rest of the flock may find other weak and anaemic individuals.



Sub acute fluke

Sub acute fluke occurs mainly between late autumn and spring. Sheep are anaemic and lose condition rapidly but survive for about two to three weeks from the outset of symptoms. At this stage the liver will contain mixed ages of fluke but not in the numbers associated with acute disease.



Chronic fluke

Chronic fluke occurs again in winter and spring resulting from lighter infections which have settled in the bile ducts. These destroy red blood cells resulting in anaemia. It is chronic fluke which produces the classic "bottle jaw".

As it takes up to twelve weeks before fluke eggs appear in the faeces, such examinations are of no use in diagnosing acute or subacute fluke in the autumn. Sadly often the first sign of acute fluke is sudden death, particularly on farms not previously affected.

Chronic fluke can be diagnosed by the examination of faeces and the presence of a single egg is sufficient to confirm fluke. Clinical diagnosis and post mortem examination are the most reliable to confirm acute and subacute fluke. Abattoir feedback on liver damage is a useful source of information and farmers should actively request this feedback when they sell their lambs direct to abattoirs.

Flock health planning plays a crucial role in the prevention and control of fluke infestation. Your vet will be aware of the wider distribution of fluke in your area and also whether it is moving into a previously free area. Strategic dosing is the best control. It is impossible to remove the snail population although good drainage and fencing off wet areas may help reduce the level of challenge.

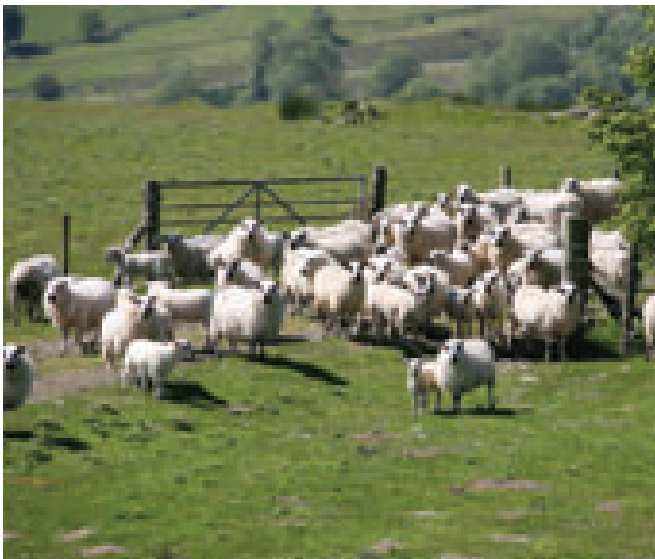
For treatment in late summer and autumn, a flukicide that is active against immature fluke is recommended. Treatment may need to be repeated through the autumn and winter, if there is a severe challenge. If a spring treatment is required (April - June), then a flukicide with adult activity only can be used reducing the selection pressure on those active against immatures.

Various flukicides are available. It is important to choose the correct product.

Do not use combination fluke and worm products, if worming your animals is not necessary as these pose a real danger in increasing resistance in roundworms. Use a flukicide only. It is also no good using a product that only kills adult fluke in the autumn, when immature fluke are the real threat. Consult your vet as to the best product to use and include the best times to use these products in the flock health plan.

Resistance has been detected to products containing triclabendazole on some farms. This needs to be borne in mind if poor results from dosing are seen, however failure to improve may be due to reinfection from heavily infested pasture so it is important to investigate perceived lack of efficacy of treatments. Monitor fluke levels in your lambs by requesting feedback if you sell your lambs direct to the abattoir. This will help you to understand what the level of infection is and whether current control programmes are effective.

Cattle generally suffer from chronic fluke and are therefore a source of pasture contamination. If you are fluke free, an effective fluke treatment is required within your quarantine programme to ensure fluke does not enter your farm.



Coccidiosis

Coccidiosis is caused by an infection with the protozoan *Eimeria spp* which enters the gut lining. Infection occurs by the ingestion of the parasite's oocysts (eggs). These hatch in the small intestine and invade the cells both there and in the large intestine. In these cells they undergo a series of changes and finally reach the stage where oocysts are shed in the faeces.

The source of the initial infection can be oocysts which have survived on the pasture from the previous year or from small numbers shed by the ewe contaminating the environment.



Lamb with coccidiosis

© Nadis

A light infection causes no lasting damage and lambs quickly develop immunity and are protected from further disease.

Serious outbreaks of scouring and disease are associated with the ingestion of large numbers of oocysts. The risk factors for serious outbreaks include:

- poor hygiene with faecal contamination on the udder of ewes,
- the continual use of a single sheltered turnout pasture heavily contaminated from previous years or from the current year if lambing is prolonged.

Infected lambs scour and flecks of blood and mucus may be visible. Examination of the faeces may yield up to a million oocysts per gram. However as there are nine species but only two pathogenic species - counts of the 100% pathogenic species can be far lower. Very high counts without clinical signs are unreliable for this reason and do not mean that you have a coccidiosis problem.

Timing of treatment can vary and advice should be sought from your vet.

Measures to reduce infection rates include;

- Good hygiene
- Keeping ewes clean
- Application of hydrated lime around drinking troughs and feed troughs
- A tight lambing pattern with the use of several turnout paddocks
- Avoid following young lambs behind older lambs at pasture, as the older lambs multiply the infection and the younger ones become exposed to large numbers of oocysts.

External parasites

All parasite infestations of the skin and fleece are costly in loss of condition, treatment and welfare.

Effective control depends on correct identification of the parasite(s) involved.

Ticks and midges transmit other serious diseases.

Permanent ectoparasites (i.e. those that spend their entire life cycle on the sheep) include sheep scab and chewing lice. Less common ones include ear mites, other mange mites, sucking lice and keds.

Semi-permanent ectoparasites (i.e. those with at least one free living life stage) include blowflies and ticks. Less common ones include nasal bot flies.

Diagnosis of Ectoparasite Infestations

If you suspect an ectoparasite problem in your flock it is important that it is confirmed and identified by a vet. Don't forget that sheep may carry more than one ectoparasite (e.g. scab and lice) simultaneously. Sheep can also be affected by a number of non-parasitic skin diseases.

Sheep Scab

Sheep scab is an allergic dermatitis, caused by the mite *Psoroptes ovis*. Skin damage is mainly as a result of host scratching but also through trauma caused by the mite's mouthparts. Skin damage increases leakage of serum, with accompanying scab formation and skin thickening. Early sub-clinical disease is characterised by low mite numbers and very small lesions. Sheep with sub-clinical scab can look perfectly normal and can unknowingly be introduced into a flock.



Sheep scab

Later stages of infestation are characterised by a rapid increase in mite numbers and scab cover. Rubbing and head tossing become more pronounced; areas of wool loss may appear, together with open, bleeding wounds. Sheep rapidly lose condition.

Transmission

Sheep scab can be contracted via contact with live mites in tags of wool or scab attached to walls, brambles and bushes.

The majority of scab outbreaks come from;

- a) neighbouring farms, through badly maintained fencing and stray sheep or common grazing
- b) sheep-to-sheep contact at market or in livestock lorries

Lice

Chewing lice (*Bovicola ovis*) are small, pale to red/brown insects that feed on epithelial scales, wool fibres and skin debris. Infestations of lice cause a chronic dermatitis, characterised by irritation, itching, rubbing, tagging and biting of the fleece. Chewing lice spread slowly among sheep. Most, but not all, cases occur in the winter. Severity of infestation appears to depend on the breed, fleece length and overall health of the host together with the ambient climate.

Irritation due to modest infestations is enough to provoke scratching and rubbing with damage to fleece and hides. Immune responses to *B. ovis* can result in the nodular skin defect known as "cockle", downgrading the value of the leather.

Blowfly Strike

Blowfly strike is the result of an infestation of living tissues with the larvae (maggots) of flies (*Diptera*). Signs of blowfly strike include agitation and dejection. In breech or tail strike, infested sheep stamp their hind legs, shake their tails vigorously or gnaw and rub at the breech. As lesions develop a distinctive odour is noticeable and the wool becomes matted and discoloured. If the infestation remains untreated the affected area increases and wool is shed from the centre, accompanied by signs of constant discomfort.

In body strike, flies are attracted to sheep by the odours of excessive "sweating" and/or decaying organic matter in the fleece, usually over the loins, shoulders, flanks, neck, back, throat or abdomen. In breech strike, flies are attracted to fleece contaminated with urine and/or faeces and therefore scouring animals are at greater risk. The prevalence of blowfly strike is weather-dependent,

with most cases of body strike occurring during periods of high humidity or warm periods after heavy rain. Breech strike depends less on weather as the moisture supplied by urine and/or scouring is sufficient to attract flies.

The risk of blowfly strike can be reduced through shearing, crutching or dagging from early April and repeated every 4 to 6 weeks to remain effective. There is some evidence that susceptibility to strike may be hereditary therefore breeding ewes and rams continually struck should be culled.

Ticks

All active tick stages feed on the blood of sheep. Ticks can be vectors of a number of important diseases affecting sheep, other livestock and humans, such as:

- Tick borne fever (TBF)
- Tick borne encephalitis
- Louping ill
- Lamb pyaemia
- Lyme disease

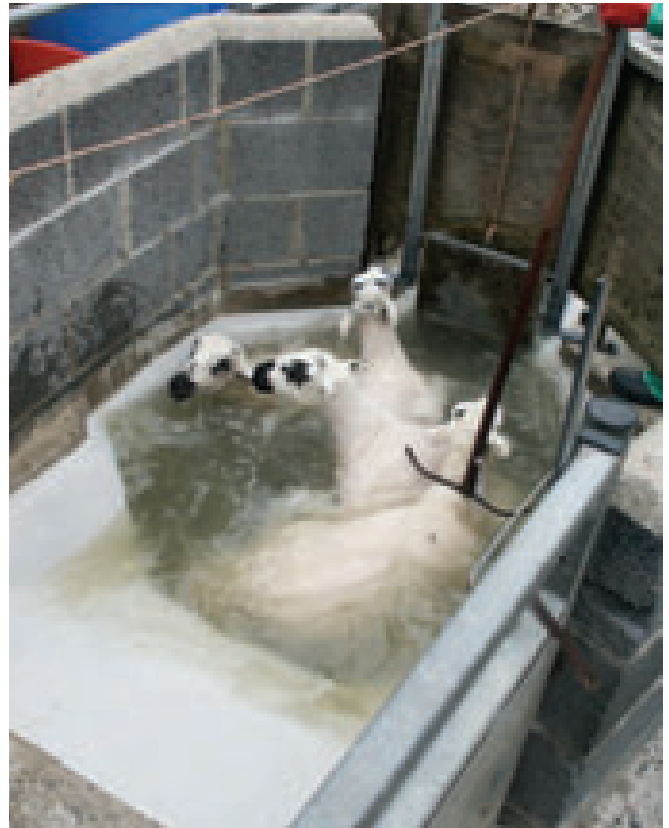
Off the host, ticks require a humid environment to survive, usually found at the base of dense vegetation, particularly in rough grazing, moorland, heath or woodland.



Tick

Chemical Treatments

It is important you know which parasite you are treating before deciding which treatment will be most effective. All ectoparasite treatments should be administered strictly according to the manufacturer's instructions. Misuse can be ineffective, harmful to the environment and select for resistance in the ectoparasites or roundworms (depending on the activity of the treatment). If using injections or pour-ons sheep should be weighed.



Chemical treatments

Licensing for the use and disposal of OP dips is necessary. Dip baths should be accurately calibrated. Allow dipped sheep to stand in the draining pen for at least 10 minutes to catch and return any run-off to the dip bath. Do not return freshly dipped sheep to normal grazing. Put them in a holding field (with no natural watercourses) next to the dipping set-up with a trough of fresh water for a minimum of 24 hours. If there are natural watercourses in the holding field, fence them off from livestock access.

Key steps to control of external parasites

Itchy sheep need careful examination and a correct diagnosis of the cause.

Make sure the chosen treatment actually controls the condition identified.

If permanent ectoparasites are found on one animal the whole group should be considered infested and treated at the same time.

One missed sheep could re-infest the whole flock.

Protect the operator and the environment through careful handling and use of treatments.

Operate a quarantine policy for incoming stock.

Mastitis

Acute mastitis can kill within 24 hours

Check for chronic mastitis after weaning.

The occurrence of mastitis varies enormously from flock to flock and season to season. Two principal forms occur, the very acute and the chronic.

Two groups of bacteria have been shown to be responsible for most of the cases, *Staphylococcus aureus* and *Mannheimia haemolytica*. These bacteria are present all the time on the skin and in the mouths of ewes and are passed to the teat ends by the lambs. *Escherichia coli* can also cause mastitis and is picked up from the environment. Keeping bedding clean and avoiding muddy paddocks will help to avoid infection.

In acute infections usually seen from ten days to three weeks after lambing, the first indication is often a ewe, lame on a back leg with hungry lambs in attendance. Untreated, the ewe will probably die within twenty four hours. If any success is to be achieved very aggressive antibiotic treatment is necessary.

This includes injection of antibiotics which quickly penetrate the tissues in the udder. If acute mastitis has been a problem this is an area in the flock health plan that needs to be discussed in depth and your vet will be able to advise on the most suitable products. Whilst it is rare to save the affected ½, the ewe should survive. Chronic mastitis is usually discovered at weaning or when the ewes are checked for breeding suitability in the autumn. In these cases the udder is hard or contains a number of hard lumps. Lambs from these ewes may not have performed as well as lambs from healthy ewes.

Triplet bearing ewes which have reared all three are susceptible to mastitis due to bruising by over-zealous lambs. Poorly fed ewes will have limited milk supply and



Sheep mastitis

thus hungry lambs, also making them more susceptible to mastitis. Poor hygiene with contamination of the udder will allow the entry of bacteria which only cause a chronic reaction rather than an acute mastitis.

There is also evidence that some breeds and some families within a breed are more susceptible to mastitis. It makes sense not to retain for breeding any ewe lambs from an infected ewe. Excessive crutching prior to lambing leaving the udder exposed to the elements has also been suggested as another cause.





Metabolic Diseases

Twin lamb disease (pregnancy toxæmia)

Twin lamb disease is seen in thinner ewes, often older ewes carrying more than one lamb. It is a deficiency in energy due to a decline in the level of nutrition during the late stages of pregnancy when 70% of foetal growth takes place.

Affected ewes appear disorientated and separate themselves from the rest of the flock. They are lethargic with no appetite and eventually go blind. Treatment is often unsuccessful and death can occur. The ewe should be isolated and offered palatable feeds and water. Treatment with propylene glycol, intravenous glucose injection and glucocorticoid injection is successful in some cases which are still able to walk when treatments commence.

These ewes need to be checked regularly for signs of lambing or abortion as they may be too weak to expel the lambs unaided.

Hypocalcaemia

Hypocalcaemia is a lack of calcium in the blood stream and usually occurs in the late stages of pregnancy and early stages of lactation when the demand for calcium is at its highest. The affected ewe is weak and unable to stand. The rumen stops working and fluid is often expelled from the nose. Without treatment the ewe can fall into a coma and die within 24 hours.

Affected ewes respond well to treatment which ideally should be a slow intravenous administration of 20-40 mls of a 40% calcium borogluconate solution given over 30 to 60 seconds. Eructation (belching) is seen 1-2 minutes after the injection and she will often quickly stand and walk away within 5 minutes. Alternatively a subcutaneous injection of 60-80 mls of 40% calcium borogluconate solution may be given in 2 or 3 sites over the thoracic wall behind the shoulder; it may take up to four hours before she responds.

Hypomagnesaemia

Hypomagnesaemia or grass staggers occurs in spring and is a deficiency of magnesium caused by the forage having insufficient magnesium levels to meet the animal's requirements. It is often associated with a sudden cold, wet spell of weather and animals on lush grazing.

Hypomagnesaemia occurs in ewes within the month before or after lambing, the highest incidence occurring after lambing. Affected sheep often have hypocalcaemia as well and should be treated for both conditions.

The first signs are often death but occasionally the ewe will exhibit restlessness and unsteady walking. She will then lie down and have involuntary leg movements and frothing at the mouth.

Treatment is in the form of a subcutaneous injection of magnesium sulphate and an intravenous injection of a calcium/magnesium mixture.

Control of metabolic diseases

The metabolic diseases discussed here are all associated with the pregnant ewe as she approaches lambing. The key to controlling them is body condition scoring the ewe throughout pregnancy and making corrections to her diet based on her nutritional requirements. In large flocks, division of ewes into different groups based on the number of lambs being carried allows for appropriate diets to be fed. Once again planning and being aware of the nutritional value of diets is important in preventing this condition. Supplementation with standard sheep minerals during high risk times should also be considered.



Blindness caused by twin lamb disease

Scrapie

Scrapie is a fatal brain disease of sheep and goats.

It is a notifiable disease.

The genetics of the sheep influences the development of clinical disease.

Most cases of scrapie occur in sheep between two and five years of age and animals will show a combination of non-specific symptoms. Scrapie should be considered in any sheep or goat over 12 months of age showing nervous or behavioural changes. If there is no obvious alternative diagnosis, the case must be reported to your local AHVLA Field Services Office for further investigation.

If scrapie is confirmed measures will be taken to remove and destroy the affected animals and compensation will be paid on these animals. AHVLA will then consider entering the flock into the Compulsory Scrapie Flocks Scheme. The scheme imposes either a slaughter of all small ruminants present on the holding, or genotyping of the entire sheep flock. There are derogations for rare breeds to prevent in-breeding.

Where genotyping is carried out, those animals most resistant will be kept as breeding stock. Less resistant animals will be slaughtered for human consumption and those showing the least resistance will be removed from the holding and destroyed as Specified Risk Material (SRM). Compensation will be payable for animals destroyed as SRM.

Once the animals on your holding have reached the required levels of scrapie resistance, restrictions will be enforced on sale, purchase and breeding on the holding for a period of two years.

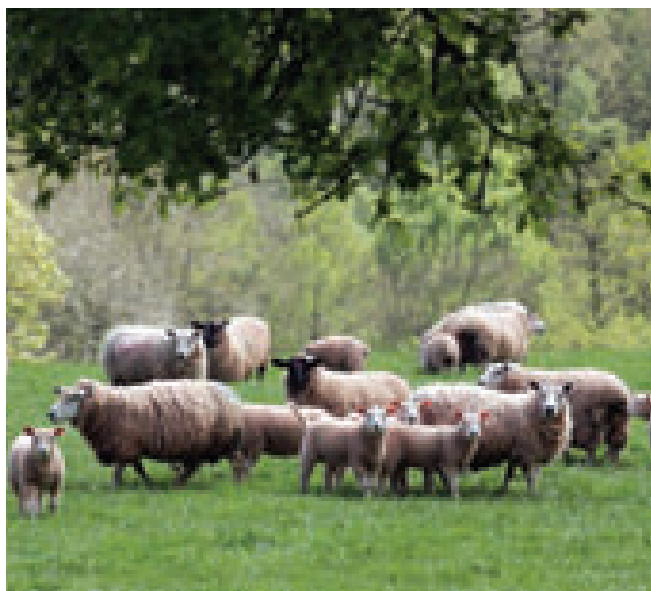
In all cases, there is a two year period of TSE testing with negative results before a flock is free of movement restrictions.

Symptoms

Most sheep show a gradual development of clinical signs over a period of several weeks or even months, although in some cases e.g. stress, the condition may worsen rapidly. Clinical signs may include:

Irritation

- Repeated rubbing of flanks and hindquarters against objects
- Repeated scratching of flanks
- Nibbling or grinding teeth when rubbing themselves or when rubbed firmly on the back



- Continued scratching of a shoulder or ear with a hind foot
- Unusual or agitated nibbling of the feet, legs or other parts of the body
- Excessive wool loss or skin damage

Changes in behaviour

- Excitability
- Drooping ears
- Increased nervousness or fear
- Lagging behind a moving flock
- Aggression
- Depression or vacant stare

Changes in posture and movement

- Unusual high stepping trot
- Severe lack of coordination
- Stumbling
- Standing awkwardly
- Weak hind legs
- Unable to stand

Later symptoms

- Dramatic weight loss and death

The only certain way to find out if an animal is infected is to examine the brain tissue under a microscope after slaughter or death.

Atypical Scrapie

Atypical scrapie cases tend to occur in animals over 5 years old with genotypes considered more resistant to classical scrapie and there is seldom more than one case in a flock.

How do I stop my animals contracting scrapie?

Infected birth fluids, membranes and placentas (cleansings) probably spread the infectious agent around the pastures or the building during lambing. Regular cleaning of buildings used for lambing and prompt removal of afterbirths may reduce exposure of the sheep to the agent. It is also advisable to avoid grazing sheep on pastures recently used for lambing ewes.

Susceptibility to scrapie is genetically controlled and blood testing and selection of breeding animals for resistance is the basis of the control of classical scrapie. Breeding from animals that are resistant to classical scrapie will reduce the incidence of the disease and may lead to its eradication.

Scrapie Monitoring Scheme (SMS)

Membership of this scheme enables flock owners to demonstrate compliance with the EU Regulations concerning the export of breeding sheep, goats, semen or embryos to other EU States and further afield. In addition to adherence to a set of rules, flocks must undertake post mortem testing of fallen stock. For further information on the SMS contact the Premium Sheep and Goat Health Schemes (Tel 01463 226995).

Key steps to control of scrapie

Scrapie is a notifiable disease - suspect cases should be reported to the local AHVLA Field Services Office.

The genetic component allows for the breeding of clinically resistant sheep – select rams for resistance as a minimum.



Caseous Lymphadenitis (CLA)

CLA is a chronic infectious disease that causes abscesses in the lymph nodes and internal organs

Lesions most commonly seen are external lumps that are usually abscesses in lymph nodes

Losses occur through culling of infected animals and whole or partial carcass condemnation

CLA can affect animal condition, milk production and reproductive performance

It is caused by a highly infectious bacteria that can survive in the environment for several months

It is present throughout the UK and is emerging now in the commercial sector

The main cost of CLA in Wales is the loss of sales of breeding animals that become infected



CLA abscess

Caseous lymphadenitis (CLA) is caused by *Corynebacterium pseudotuberculosis*. It mainly enters through cuts and abrasions but can also be breathed in. The condition causes abscesses in the animal's lymph glands and internal organs, most commonly the lungs.

In the UK CLA is most prevalent within terminal sire sheep breeds. In most flock outbreaks the first animals to be identified with CLA have been rams.

In one British flock of over 3,000 sheep it was estimated that the total losses incurred by the business as a direct result of CLA were around £15,000; including culling losses, vaccine costs and associated veterinary expenses.

Testing

There is a blood test that detects antibody to *C. pseudotuberculosis*. This test forms the basis of the CLA Monitoring Scheme, operated by the Premium Sheep & Goat Health Schemes, in which breeding animals are screened for evidence of infection prior to sale. The blood test has been used to successfully control and even eradicate the disease through regular testing of all adult animals within the flock.

Vaccination

CLA in sheep is effectively untreatable, since even prolonged use of antibiotics usually fails to eliminate all the infectious organisms from the body. As yet no licensed vaccine is available in Wales – although it may be possible to obtain them under an emergency licence from the Veterinary Medicines Directorate. It is also possible to have an autogenous vaccine specifically prepared for use in an infected flock.

Controlling spread

Isolating young stock from all older sheep from weaning onwards has been shown to greatly reduce spread of the infection amongst the younger groups. If over time, no evidence of infection is apparent amongst these juveniles, they may be prepared for sale with a degree of confidence that the disease will not be passed on to potential purchasers. The addition of blood testing with negative results will then allow the owners of infected flocks to sell young breeding stock with increased confidence that CLA is not being sold on too.

Key steps to control of CLA

Don't buy or lease infected animals

Quarantine introduced animals

Cull infected animals

Rigorous hygiene and disinfection especially of shearing equipment

Blood test to screen animals

Vaccines available in UK under emergency licence

Maedi Visna

Maedi visna (MV) is a viral disease that entered Britain more than 30 years ago. Sheep of any age can become infected, but as there is a long incubation period signs are typically seen in animals of more than two years of age. There is no cure or vaccine available and MV is fatal once clinical signs have developed.

Clinical signs include:

- pneumonia
- progressive paralysis
- wasting
- arthritis
- chronic mastitis

MV is a highly contagious disease and by the time the disease is identified in a flock, a high proportion of animals are likely to test positive. Recent research has shown that the number of infected flocks in the UK is increasing. The disease is costly with increased ewe culling due to wasting, general poor health, chronic mastitis and poor fertility. There is also a reduction in overall flock productivity, with reduced lamb crops, increased lamb losses and poor lamb growth rates.

A voluntary accreditation scheme is available through the Premium Sheep and Goat Health Schemes, which requires accredited sheep to be kept completely separate from non-accredited sheep. Membership of this scheme can add value to the sale of breeding stock and can form an important strategy in flock biosecurity.

Border Disease

Border disease is also known as 'hairy shaker' or 'fuzzy lamb' disease. The disease is caused by infection of the foetus in early pregnancy with border disease virus (BDV), a virus which is very closely related to bovine viral diarrhoea (BVD) virus in cattle.

When susceptible ewes in early pregnancy are infected, the virus crosses the placenta and invades the foetus. The ewe shows no disease but the foetus is infected and may die and be aborted or born stillborn. Some infected foetuses will be born alive and appear normal but will be persistently infected (PI) and become a constant source of infection in the flock.

There is currently no vaccine available and the focus should be on not allowing the disease to enter your flock. The most common way for a flock to become infected is through buying in replacement stock in the autumn that are persistently infected. These infect the flock and the disease becomes evident at lambing the following year with abortions and stillborn lambs.



Vector-borne viruses

In recent years farmers will have become aware and may have experienced two viral diseases that were previously unknown in the UK, Bluetongue virus (BTV) and Schmallenberg virus. Both are carried by midges and infection occurs as a result of sheep being bitten by infected midges.



Bluetongue virus

Bluetongue virus is transmitted by midges of the *Culicoides spp* and was first detected in the UK in 2007 but farmers were aware of it prior to this due to increasing numbers of cases being detected across continental Europe.

Clinical signs in sheep

- Eye and nasal discharges which become thick and crusty
- Drooling as a result of swelling and/or ulcerations in the mouth
- Higher than normal body temperature
- Swelling of the neck and/or the face, especially around the eyes and the muzzle
- Severe lameness – affected sheep are reluctant to rise
- Haemorrhages into or under the skin
- Inflammation and pain at the junction of the skin and the horn of the foot – the coronary band
- Respiratory problems – difficulty breathing
- A 'blue tongue' is rarely a clinical sign of infection
- Sheep are apparently sick, look tired and lethargic
- Production losses may be prolonged and include infertility (especially in males) and reduced lambing percentages
- Flock mortality may reach as high as 70 per cent and those that survive may lose condition and experience reduced wool and meat production

Vaccines were produced and these proved very effective in bringing the disease under control and limiting the

spread of the disease but affected farms did in some cases suffer considerable losses. Great Britain was officially declared free from bluetongue on 5th July 2011. The key implications now for sheep farmers are:

- There are no further BTV specific restrictions on exporting sheep and cattle from Great Britain.
- Current import controls remain for susceptible livestock entering GB from BTV restricted zones across Europe.

For the latest information on the situation regarding BTV and any import and export restrictions please refer to the Welsh Government, AHVLA and Defra websites.

While farmers need to remain vigilant in case this disease re-emerges in Wales specific treatments or vaccines do not need to form part of the flock health plan.



Schmallenberg virus

Schmallenberg virus was detected in northern Europe during autumn 2011 following disease in cattle that included fever, loss of appetite and body condition and diarrhoea. From December 2011 deformed foetuses were born to animals in the affected regions. The first case of Schmallenberg in the UK was detected in early 2012 and has since spread across the UK causing devastating losses to some sheep flocks.

The disease is transmitted by midges of the *Culicoides* spp and possibly other vectors and if an animal becomes infected during pregnancy the foetus may be born with severe abnormalities depending on what stage of pregnancy the infection occurred. Foetuses with abnormalities may result in lambing difficulties and veterinary advice should be sought to ensure the safety and welfare of the ewe.

It is not a notifiable disease. A vaccine was granted a provisional marketing authorisation in 2013. This is a brand new disease and as yet there is much not known about the disease and its implications to farmed livestock. The Welsh Government and AHVLA websites will have the most up to date information for producers seeking further information.

Farms need to plan accordingly in their flock health plans. This will require close collaboration with their vet to ensure they have the latest advice and know which course of action to take.

Farm-specific problems

There are many other conditions such as watery mouth, lameness in young lambs, listeriosis, Ovine pulmonary adenocarcinoma (Jaagsiekte) and Johnes disease in ewes which require an individual approach during the flock health planning stages and are based on previous history of losses.



Lame sheep do matter!

Why is lameness important?

Lame sheep cause economic loss
Lame sheep are a major welfare issue
Lameness means the sheep is in pain
Lameness leads to losses in production

Rams

- Lower fertility
- Unable to serve ewes

Ewes

- Lower lambing percentage
- Increased risk of pregnancy toxaemia
- Lower lamb birth weights
- Less milk production
- Less wool produced

Lambs

- Increased mortality
- Reduced growth rates



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What are the common causes of lameness?

Scald and footrot are the commonest causes and can affect many animals within a flock. In young lambs, joint infections are the main problems, often caused by bacteria in the environment.

But there are other important causes of lameness in all age groups, so making a correct diagnosis is very important - only then can the correct treatment be chosen and measures to try to prevent future problems be decided upon.

Distinguishing features of different types of foot lameness

- **Scald** - the skin of the cleft between the claws is inflamed, moist and swollen, but there is no separation or under-running of horn. All age groups are vulnerable, often many animals being affected within a short time period.



Scald

- **Footrot** - this starts as scald between the claws, and spreads to separation of the horn near the heel, extending along the sole and even up the wall in serious cases. There is the typical footrot smell, with accumulation of blackish cheesy debris under the loosened horn. The bacterium *Dichelobacter nodosus* is found in scald and footrot, usually associated with *Fusobacterium necrophorum*. Footrot is an infectious disease, *D.nodosus* survives in the feet of infected sheep while *F. necrophorum* can only live on pasture for about 2 weeks. For every obvious case there will be several other less obvious cases, and it will never be effectively controlled unless it is treated as a flock problem.



Early footrot showing underrun heel



Severe footrot

- **Contagious ovine digital dermatitis (CODD)** - the cause of this serious disease is not fully understood but is probably associated with the organisms that cause digital dermatitis in cattle. In contrast to footrot, which starts in the sole and spreads outwards and upwards, this starts with a sore area at the coronary band and spreads down the claw rapidly undermining the horn. In severe cases the whole horn capsule is detached leaving raw exposed claws. Permanent damage to the foot may result. Treatment and control protocols for footrot are not effective for CODD. Consult your vet to formulate a suitable plan which is likely to involve the use of antibiotic footbaths and injections. Your vet will advise you on which are the most effective.

- **Shelly hoof** - this is a common condition in which the outer wall of the claw becomes loosened forming a pocket which becomes impacted with soil. The sheep only becomes lame when the soil is forced far under the hoof wall and an abscess forms which eventually bursts at the top of the hoof. The sheep then gradually recovers but lameness may recur if the loose horn is not trimmed away.
- **White line (toe) abscesses** - this develops along a track under the horn of the wall causing acute lameness. Eventually pus bursts out at the top of the hoof after which the sheep gradually recovers, although the horn may become loosened and cracked.
- **Pedal joint abscess** - this serious type of infection is more common in heavy rams. The animal is extremely lame with a swollen painful claw. Pus bursts out at several places around the tip of the hoof, including between the claws, often with loss of hair above the hoof. The joint within the hoof becomes permanently damaged and the animal remains chronically lame. Veterinary treatment is necessary; often the only answer is to amputate the claw.
- **Granuloma (Proud flesh)** - this is often the result of too severe paring but can also follow severe footrot or puncture wounds. A strawberry-like growth develops which may become covered with loose horn but never heals properly and bleeds when touched. Veterinary attention is needed.

Other types of foot lameness include soil balling, puncture wounds and growths of skin between the claws which become infected and painful.



Shelly hoof



Pedal joint abscess



Granuloma result of overparing

Lame sheep - treatment

Treatment of lameness

Lameness in sheep requires an accurate diagnosis of what is causing the problem before deciding on which course of action to take. Scald, footrot and CODD need to be treated as flock problems, since only picking out individual lame animals for treatment will only result in satisfactory control if done promptly and regularly (every few days). Various treatments are available and should be selected based upon the particular flock circumstances. When an individual sheep or flock is lame and fails to respond to the usual treatments, veterinary advice should be sought.

Footbathing

This is an effective way of treating scald and mild footrot on a flock basis when there are suitable facilities on farm. Sheep must have clean dry feet before bathing and stand on a hard dry surface for at least 20 minutes afterwards. Stand-in pens, which can hold a number of sheep, are better than walk-through baths; this makes sure that all feet are treated and allows sheep to be held in the treatment for the required length of time. Gathering sheep in damp or dirty handling pens will spread foot rot.

Several different chemicals are available. The best known are:

- **Zinc sulphate** - (10%). Needs a stand-in time of about 5 minutes, sometimes longer (read the instructions!).
- **Formalin** - (2-3% is usually adequate, never stronger than 5%). Walk-through, but has the disadvantage of being unpleasant and irritant to use; it can also cause too much hardening of horn if used frequently. However weak formalin (2%) may be the most practical way of treating scald. Formalin footbaths should be made up fresh as they degrade when muddy.

Other treatments for lameness include;

- **Antibiotic sprays** - Effective against scald and mild footrot, particularly for individual or small numbers of sheep. Not to be used with footbathing as it gets washed off and is just a waste of money!
- **Antibiotic injections** - Can be very effective for footrot cases and for ewes in late pregnancy to avoid too much handling. Also may be necessary for foot abscesses where pus cannot be easily released. Consult the vet for advice on antibiotic use.
- **Antibiotic footbaths** - these may be necessary to treat CODD, but you should take veterinary advice on their use.



Lame sheep - prevention

Remember, if the cause of lameness is not clear, normal treatments are not working or a sheep is severely lame veterinary help should be sought on welfare grounds.

Prevention of lameness

It will never be possible to prevent all lameness, but the aim should be to minimise the incidence of scald and footrot and CODD, if it is already present in the flock. By keeping these under control and not allowing advanced or chronic cases to develop (footrot and CODD), much less time will need to be spent on treatment of individuals.

The keys to prevention are:

- **Routine footbathing** - particularly helpful in warm weather, as well as before and during housing, to protect against scald and to prevent footrot spreading. But only useful if facilities are suitable.



Stand-in foot bath

- **Vaccination** - specifically against footrot, this can help in control, but needs to be part of an overall foot care plan. Protection is not very long lasting, so care is needed with timing. Take veterinary advice.
- **Maintaining a clean environment** - dry, well bedded pens in sheep houses and well drained areas where sheep congregate around feed or water troughs will help to prevent the spread of footrot as well as joint infections in young lambs.
- **Culling chronically infected sheep** - these act as a constant source of infection for others.
- **Trimming** - Routine trimming is no longer recommended. Only trim grossly overgrown horn if it is affecting the animal's ability to walk. Take care not

to trim so severely that the foot bleeds. Do not trim feet where there is any active infection, cure the infection first and if the foot does not wear down once the sheep is weight bearing on that foot then you may wish to do some careful paring. Studies have shown that lame sheep treated with an antibiotic injection only recover quicker than those which have an antibiotic injection plus foot paring.



Unnecessary bleeding due to over trimming

Footrot can be controlled in all flocks and eradicated from closed flocks, but it is very easy to re-introduce the disease by carelessness or lack of thought. There are ten strains of the bacteria *B. nodosus* on UK farms, some are more virulent (cause more severe disease) than others. Therefore it is important not to introduce new strains to your flock.

All new sheep coming onto a farm should be kept separate from the resident flock until they have been examined, treated as necessary and rechecked before mixing.

If you haven't got CODD you don't want it.

Don't buy it in.

Don't buy lame sheep.

Key steps to control of lameness

Correct diagnosis of the cause is essential.

Treat footrot as an infectious flock problem.

Don't wait for lameness to become a problem, use quarantine to keep it out and take pro-active prevention measures.

When in doubt of the cause seek veterinary advice.

Footbathing must be carried out with the correct strength of the chosen chemical.

Cull chronically infected sheep.

Do not purchase problem stock that can infect the rest of your flock.

Sheep abortions

Abortion causes losses of at least £100 per ewe.

The three commonest causes of abortion in ewes in Wales are enzootic abortion (EAE), toxoplasmosis and those caused by campylobacter.

EAE and toxoplasma are a risk for pregnant women.

Why is abortion important?

Every year abortion in sheep causes huge financial losses both to individual farmers and to the Welsh sheep economy. Most abortions occur in the later stages of pregnancy, thus the loss is not just the potential value of the lambs but also the cost of carrying non productive ewes through a high input period. Various estimates have

been made of the actual cost of an abortion and most studies suggest £100 per ewe minimum.

There are many reasons for ewes to abort - both infectious and non infectious. But there are three main causes which contribute to over 75% of all diagnosed cases. If ewes start to abort it is vital that an accurate and quick diagnosis as to the cause is made. This entails a laboratory submission of both the dead foetus and the afterbirth. Without both a diagnosis is unlikely to be made. Should the initial submission prove negative for the cause it is important to re-submit if abortions continue. Whatever the cause of the abortions it is vital to consult your vet as to the best way to treat and prevent in the future.



Enzootic abortion (EAE)

The commonest cause of abortion in Wales is enzootic abortion of ewes (EAE) which causes about 50% of all diagnosed cases. The organism responsible is *Chlamydophila abortus*. The life cycle is complex which makes it difficult to control.

Infection occurs at lambing time in susceptible ewes either pregnant or in those which have just lambed. The infection does not produce abortion in that year. (Except in exceptional cases where infection occurs before day 120 of pregnancy). The organism remains in the ewe in a latent state. At the next pregnancy at about day 120 the organism produces an acute infection of the placenta (afterbirth) resulting in abortion. The afterbirth and discharges from the ewe are highly infectious.

EAE abortions occur in the last three weeks of pregnancy and the products of abortion are the source of infection. But the story is not that simple. Ewes which have aborted will, at the next pregnancy, produce live viable lambs, but infection may still be present in the afterbirths and discharges. It has been demonstrated that ewe lambs will abort at their first pregnancy if derived from a heavily infected flock. Rams are unlikely to have a role in the spread of EAE.

EAE can enter a flock in several ways. The most common is by the purchase of latently infected replacement ewes or ewe lambs from infected flocks. These will abort at the next lambing. The other common entry of infection is by the purchase of ewes which have aborted and are sold on as breeding females. These will lamb normal viable lambs but as they are infected will introduce disease into the flock so abortions will occur in the second year after their purchase. Another source of infection is the carriage of infected placentas by predators (crows and foxes) from a neighbour's farm.

Initial losses can be catastrophic with up to a 30% abortion rate in newly infected flocks. Chronically infected flocks suffer losses between 5 to 12% annually.

Treatment and control can be effective but need to be discussed and planned with input from your vet. In the face of an outbreak antibiotic treatment with oxytetracycline may reduce the abortion rate but does not reduce or stop the shedding of the *C. abortus* either in the placenta or in discharges.

EAE control

Control is by the use of live vaccines. Studies have indicated that the use of vaccine in already infected flocks reduces losses to about 1% and disease can be eliminated over a period of years.

It is not acceptable or sensible to use antibiotic injection as a preventative strategy; it must be reserved for treatment in the face of an outbreak only.

There are accreditation schemes for enzootic abortion that some breeders take advantage of to add value to breeding stock that they sell. This provides the buyer with confidence that they are purchasing clean stock and for producers that have had problems with the disease this strategy could form an important part of the flock's biosecurity.



Toxoplasmosis

The second commonest cause of abortion in Welsh flocks is toxoplasmosis. Unlike EAE, toxoplasmosis is an environmental disease. The main host is the cat. Young cats will shed up to a million oocysts(eggs) per gram of faeces, but a sheep can become infected by as few as 200 oocysts. Infection arises from pasture or food stuffs contaminated by cat faeces. In the case of the upland and hill flocks this frequently occurs when supplementary feeding starts in winter and before lambing.

Four distinct stages of lamb loss are associated with toxoplasma infection.

Infection before day 70 of pregnancy results in foetal death and re-absorption producing a barren ewe. Infection between day 70 and 110 results in foetal death and mummification. In the case of twins one may survive and the other succumb. Infection from day 110 onwards results in abortion of near full term lambs. In some flocks very late infection results in the birth of weakly lambs which despite every attention die at three to four days of age.

No treatment is possible in the face of an outbreak. But once a ewe has become infected it is immune for life and will produce viable lambs in future pregnancies.

Toxoplasmosis control

Control is by vaccination. A live vaccine is available.

Remember that infected sheep are immune for life so to spread the cost some flocks will only vaccinate the replacements as they come into the flock. In this way a fully vaccinated flock is slowly established and costs are spread.

Sheep exposed to toxoplasmosis and also those that have aborted due to EAE may be identified retrospectively by blood testing.

Campylobacteriosis

This is the third commonest cause of abortion. This is caused by two closely related bacteria *Campylobacter fetus sub-species fetus* and *Campylobacter jejuni*.

Abortions occur usually in the last six weeks or in some cases weak lambs are born. Unlike EAE or toxoplasmosis there are no characteristic lesions in the placenta. Outbreaks of campylobacteriosis are sporadic but can be devastating with up to a 30 to 40% loss rate. Contamination of feeding troughs by bird faeces is a recognised source but carrier ewes may also introduce infection to a flock. Overstocking of pregnant ewes whether outside or housed seems to contribute to a greater severity of an outbreak.

Infected ewes acquire a lifelong immunity hence the sporadic nature of outbreaks. No effective treatment is available in the face of an outbreak.

Good hygiene at lambing with the immediate removal of any ewe which has aborted to an individual or sick pen helps to minimise the risk of spread to the remaining ewes, whether housed or lambing outside.

Key steps to abortion control

In cases of abortion quick laboratory diagnosis is vital and may require more than one sample for an accurate diagnosis

EAE and toxoplasmosis can be well controlled by vaccination

Antibiotics should only be used in the face of an outbreak of EAE, never as an annual preventative

Consult your vet as to the best and most cost effective way to prevent abortions in the future

Take care in sourcing replacements, are they latently infected with EAE?

Practice good hygiene at lambing and also remove any ewe which has aborted immediately to minimise the risk of spread

EAE and toxoplasma can infect people and pregnant women should not be involved with sheep at lambing time and should not come into contact with dirty infected overalls

Summary

Vaccination against clostridial disease is essential

Other diseases should be risk assessed

Orf requires a special assessment

Follow the SCOPS guidelines for the control of parasites in sheep

Fluke causes considerable economic loss and requires an individual farm strategy for its prevention

Coccidiosis may be reduced by good management

If permanent ectoparasites are found on one animal the whole group should be considered infested and must be treated at the same time

Metabolic disease can be managed by good nutrition, regular condition scoring and pasture management at turnout

Select breeding stock for resistance to classical scrapie

Operate a quarantine policy for incoming stock

Further information

Please contact HCC's Industry Development team
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For further information on this booklet or the work of HCC please visit www.hccmpw.org.uk

