

Sheep Health



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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 veterinary adviser.

The articles have been written by leading scientists and veterinary surgeons 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.





▪ Foreword	1
▪ Flock Health Planning	4
Introduction	4
Constructing the plan	5
Key steps to flock health planning	7
▪ Planning for healthy sheep	8
Clostridial Disease	8
Orf	8
Pneumonia - Pasteurellosis	9
Worms	10
Liver Fluke	11
Coccidiosis	13
External parasites	14
Mastitis	17
Metabolic Diseases	18
Scrapie	18
Caseous Lymphadenitis (CLA)	20
Farm-specific problems	21
Key steps to planning for healthy sheep	21
▪ Lame sheep do matter!	22
Why is lameness important?	22
Lame sheep – distinguishing different causes	22
Lame sheep - treatment	25
Lame sheep - prevention	26
Key steps to control lameness	27
▪ Sheep abortions	28
Why is abortion important?	28
Enzootic abortion (EAE)	29
Toxoplasmosis	30
Campylobacteriosis	30
Key steps to abortion control	31
▪ Flock Security (biosecurity)	33
Things to consider	34



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 veterinary surgeon and is an invaluable farmer/vet interaction.

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



Remember that health programs 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.

For example basic records such as scanning percentage to lambs sold, lambs lost at or within seven days of birth tell a story of where problems and thus improvements might be made. Recent problems such as parasites or fluke in pregnant ewes need to be considered. The objectives of flock performance need to be reviewed. Are lambs targeted at a certain market? Are there circumstances where ewe numbers are to be increased or reduced?

A flock health plan is a living document. It requires regular reviews at least annually. Initially it may be that two or more meetings with your advisers are necessary, particularly if you are aiming to make improvements in several areas.

Making a start

Initiation of a flock plan is best carried out eight to six weeks before rams and ewes are joined. The actual time of year will depend on the flocks 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 3 weeks before joining
- 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



Flock Health Planning

Post-tupping

Removal of rams:

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

Ewes, third month of pregnancy:

- Ewes should lose at least ½ condition score to reduce risk of prolapses
- Scan to determine how ewes should be fed
- Check copper status

In most Welsh flocks dosing against fluke will be necessary in October and January.

Prelambing:

- Decide on supplementary feeding regime.
- Analysis of home grown fodder is recommended
- Condition score ewes regularly
- Adjust feeding for groups either by age or preferably by foetal load
- 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 must be completed at least six weeks before due lambing date
- In larger flocks make early arrangements for lambing time assistance

Lambing:

- Record deaths and abortions
- Carry out routine procedures such as navel dressing
- Treat and if necessary 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
- All multiple bearing ewes should be wormed to suppress the post parturient rise
- If coccidiosis is a problem preventative dosing should be instituted
- Take evasive action against nematodirus if necessary

Lambs at six to eight weeks:

- At this stage lambs require their first dose of clostridial vaccine with or without a pasteurilla component, the latter depends upon a risk assessment

Late Spring - Summer:

- By end of May or early June all sheep need to have been vaccinated against Bluetongue
- 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.

The above is a broad outline of the subjects requiring discussion during the formation of a Flock Health Plan. Each individual flock requires a

Flock Health Planning

plan that is specific to itself. There are so many variations on 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. The classic example was the emergence of Bluetongue in to the UK in 2007.

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



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 body 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 any sheep ever dying from a clostridial infection.

Correct usage of vaccines is of paramount importance. These are inactivated vaccines, hence they require two doses to afford protection. A single dose only acts as a priming dose and affords little or no protection.

Breeding stock should receive two doses as lambs. If bred as ewe lambs the next dose is given 4-6 weeks before lambing. If bred as shearlings a booster dose is absolutely necessary when they are a year old, followed by a booster again 4-6 weeks before lambing.

Failure to boost shearlings at a year old is the commonest cause of 'apparent vaccine failure'. Boosting before lambing allows for protection to be passed to the lamb in the colostrum. This protection lasts for about 12 weeks. Lambs for slaughter need two doses at about 8-10 weeks followed by a second dose six weeks later.

- Clostridial vaccination should be mandatory for every flock.

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.



Lamb orf

Disease is seen in very young lambs, grazing weaned lambs, in ewes and on ewes' teats. Frequently there is a secondary infection of the lesions with a staphylococcal 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
- Lambs can be vaccinated from two days of age, but apply under the foreleg, not in the groin as the lamb can lick that area and infect its mouth

Vaccination in the face of an outbreak in grazing lambs can significantly reduce the severity and number infected.

Other factors in the control of orf:

- Secondary bacterial infection is best controlled by antibiotics. Oxytetracycline is generally far less effective than penicillin and its synthetic derivatives
- The virus can survive for over a year in shed scabs but this is reduced to six weeks 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 sheep's lips allowing virus entry. Orf is often referred to as

thistle disease. Thistle control should therefore, be part of your farm management plan.

Orf is such an enigma that it is important that you consult your veterinary surgeon 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

About 97% 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 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* 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 as such is straightforward 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, but are less able to prevent secondary

Planning for healthy sheep

disease particularly if *Mycoplasma spp.* are also involved.

The vaccines, like those for clostridial diseases, are inactivated and require two doses to establish any immunity. Many flocks do 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. One covers for all the important serotypes to give comprehensive cover whilst another is targeted at finishing lambs.

Worms

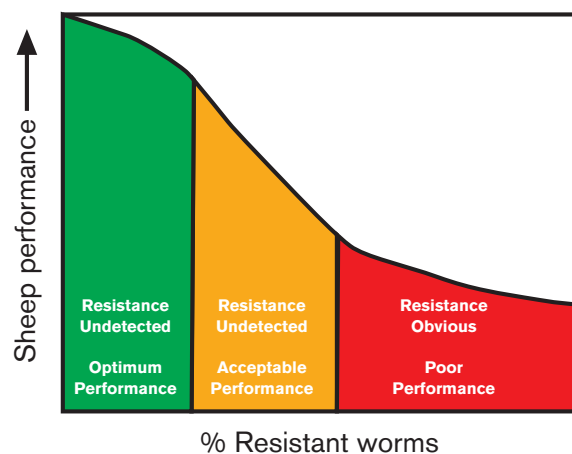
- Roundworms can cause significant production losses and even death in sheep
- Resistance to all major anthelmintic groups have been found in Wales
- The SCOPS (Sustainable Control of Parasites in Sheep) guidelines should be followed.

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 although there are only a few where resistance to all 3 groups is present. This is good news as it means it's not too late for most producers to take action and slow anthelmintic resistance down. This is because the development of resistance is a gradual process.

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 the resistance status to the 3 groups of anthelmintics we currently have available on your farm. A simple FEC test before and after drenching will get you started. Your vet or 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 weights)
- Only use wormers when necessary - use faecal egg counts to check when ewes and lambs require drenching
- Do not routinely dose ewes pre-tupping and only a percentage of those post lambing
- 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 adviser

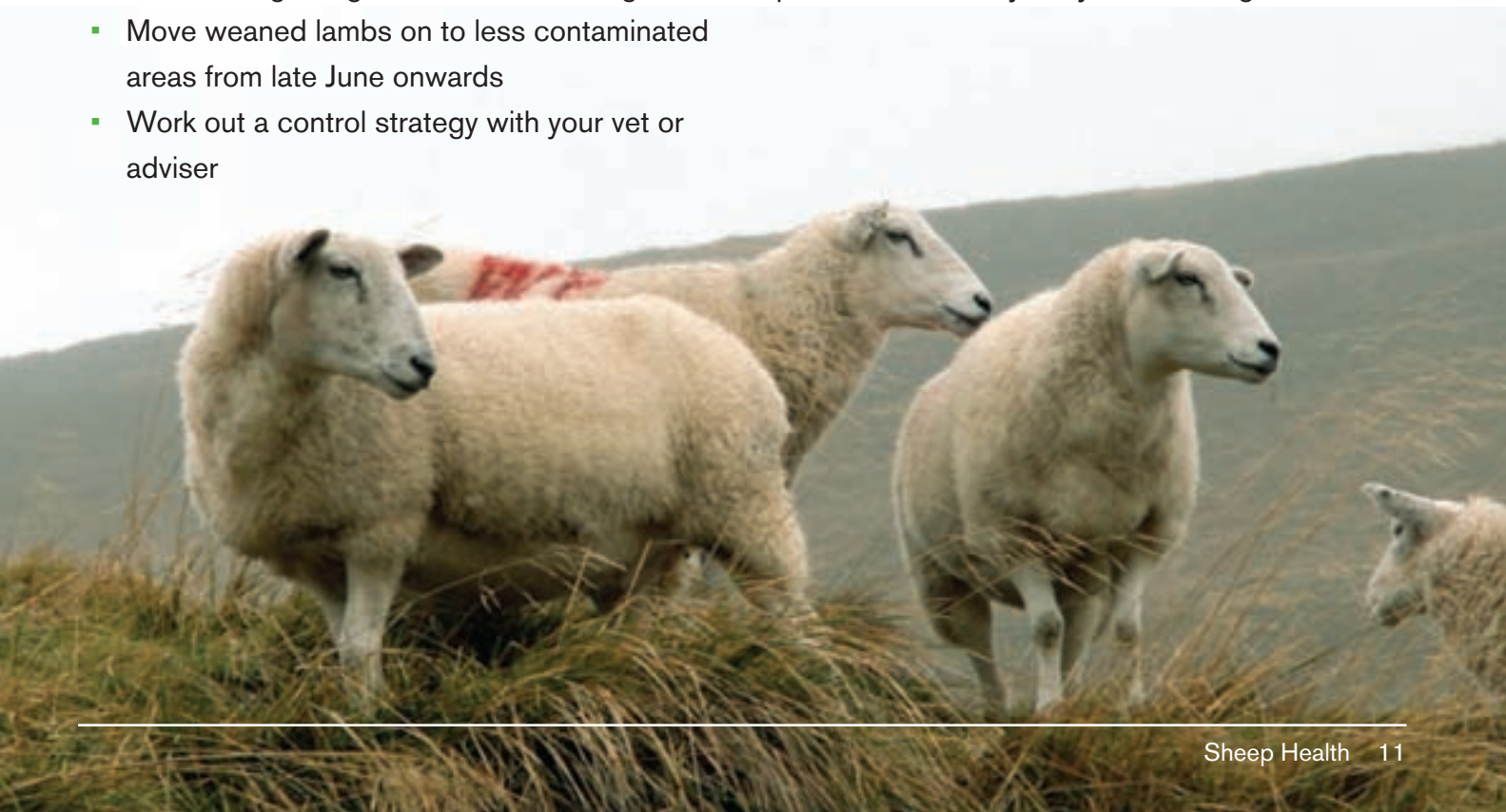
For more information consult your vet and see also the HCC booklet -'Wormer Resistance - The need to change' and the advice from SCOPS.

Liver Fluke

- Liver fluke causes substantial economic losses through mortality, 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 'flake free'. Essential to this spread and increased severity are wet summers and mild autumns and winters.

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

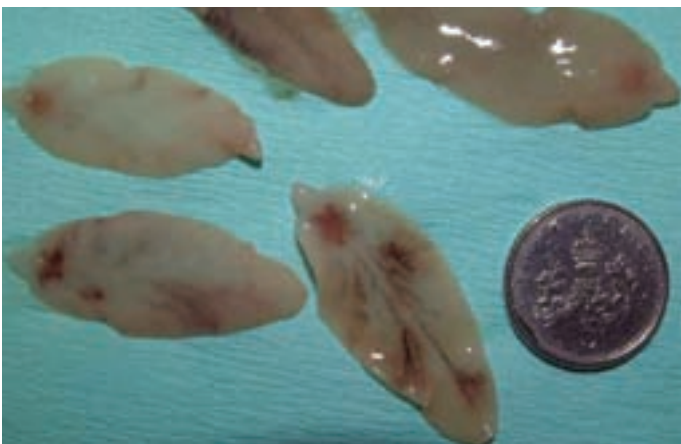


Planning for healthy sheep

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



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 outbreaks.

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 an 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 are the most reliable to confirm acute and subacute fluke. Abattoir feedback on liver damage can also be a useful source of information.

Flock health planning plays a crucial role in the prevention of fluke infestation. Your veterinary adviser 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. As with midges in the case of Bluetongue, it is impossible to remove the intermediate snail population. Although good drainage and the fencing off of wet areas may help reduce the level of challenge.

Each farm is slightly different but essentially an autumn dose in October/November with a second in January/February usually suffices. In very badly affected flocks or in particularly bad fluke years a third dose in May is sometimes necessary.

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

In particular specific flukicides should be chosen and not combination products which also treat

roundworms, as these pose a real danger in increasing resistance in roundworms. It is also no good using a product that only kills adults in the autumn, when immatures are the real threat. Consult your veterinary adviser as to the best product for each dose.

Resistance has been suspected with some of the products. This needs to be borne in mind if poor results from dosing are seen.

Cattle generally suffer from chronic fluke and are therefore a potent source of pasture contamination. If you are fluke free a fluke treatment is required within your quarantine program.

- Monitor fluke risk and plan to take action sooner rather than later.



Coccidiosis

Coccidiosis is becoming more prevalent in sheep and can cause considerable losses but its insidious nature results in poor doing lambs which never reach their potential.

Infection occurs by the ingestion of oocysts (eggs). These hatch in the lower small intestine and invade the cells. 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 lambing or from small numbers shed by the ewe and contaminating the environment.

A light infection causes no lasting damage and lambs quickly develop an 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 faeces 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 with a grey scour with a characteristic smell. Examination of the faeces will 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.

Planning for healthy sheep

Treatment is available with a well established product for sheep. Timing of treatment can vary and advice should be sought from your veterinary surgeon.

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.

External parasites

- All parasite infestations of the skin and fleece are costly in loss of condition, treatment and welfare
- Sheep scab remains a constant threat to and costs the Welsh sheep industry approximately £2.3m every year
- Control can be expensive, labour intensive and subject to strict health and safety and environmental regulatory requirements
- Effective control depends on correct identification of the parasite(s) involved
- Ticks and midges transmit other serious diseases

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

Semi-permanent ectoparasites (ie. those with at least one free living life stage) include blowfly and ticks. Less common ones include nasal bot flies, head flies and midges.

Diagnosis of Ectoparasite Infestations

If you suspect an ectoparasite problem in your flock it is important that it is confirmed and identified by a

veterinary surgeon. Don't forget that sheep may carry more than one ectoparasite (eg. 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 small haemorrhages caused by the mite's mouthparts. Skin damage increases leakage of serum, with accompanying scab formation and skin thickening. As the number of mites increases, so does the lesion.

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.

Later stages of infestation are characterised by a rapid increase in mite numbers and scab cover. Rubbing and head tossing become more excessive, 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, bushes etc.

The majority of scab outbreaks come from;

- neighbouring farms, through badly maintained fencing and stray sheep
- forced sheep-to-sheep contact at market, in livestock lorries etc.

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

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 infestation of living tissues with the larvae (maggots) of true flies (Diptera).

Signs of blowfly strike include agitation and dejection. In breech 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 or tail strike flies are attracted to fleece contaminated with urine and/or faeces and are particularly associated with scouring.

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. Tail docking will also reduce the incidence of breech

Planning for healthy sheep

strike. There is some evidence that susceptibility to strike may be hereditary therefore breeding ewes and rams continually struck should be culled.

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. The thicker the vegetation the heavier the tick population.

Chemical Treatments



All ectoparasite treatments should be administered strictly according to the manufacturer's instructions. Misuse can affect the sale of products through consumer and environmental concerns and possibly select for resistance. Dip baths should be accurately calibrated. If using injections or pour-ons sheep should be weighed.

Allow dipped sheep to stand in the draining pen for at least 10 minutes to catch and return any run-off to the dipbath. 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.

Administration of an inappropriate treatment may require repeat treatments and possibly select for insecticide resistance. The inappropriate use of an avermectin injection for chewing lice may select for avermectin resistance in gut worms.

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

For more information consult your vet and see also the HCC booklet 'Effective control of ectoparasites in sheep' and the Environment Agency's 'Stop Every Drop Campaign'.

Mastitis

- Acute mastitis can kill within 24 hours
- Check for chronic mastitis at weaning.

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



Sheep mastitis

Two groups of bacteria have been shown to be responsible for most of the cases; *Staphylococcus spp* and both *Mannheimia* and *Pasturella spp*.

In acute infections usually seen from 10 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 aided by intra-mammary tubes based on a cephalosporin product. 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 veterinary adviser will be able to supply the best products. Whilst it is rare to save the affected 1/2 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 considerable amount of hard lumps. Frequently the lambs from these ewes are comparatively poor doers.

Triplet bearing ewes which have reared all three are susceptible due to bruising by over zealous lambs. Poorly fed ewes have limited milk supply and thus hungry lambs, 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 are more susceptible to mastitis and some families within a breed. 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.

- Treat acute mastitis promptly and aggressively

Planning for healthy sheep

Metabolic Diseases

- Management and nutrition can prevent metabolic diseases

Calcium, magnesium and twin lamb disease are the three commonest metabolic diseases. Many flocks escape with never having experienced major problems but may have encountered sporadic cases.

Unlike cattle, calcium deficiency is seen pre-lambing whilst magnesium deficiency is seen post lambing. Calcium deficiency is usually diet related with too little roughage available, such as unpalatable silage or musty hay.

Supplementation of concentrates in the last 3 weeks with a standard sheep mineral will help. Again this is a classic case where good health planning will identify the problem and correct it, before it can damage your flock.

Magnesium is not stored in the body so ewes require a daily intake. Ewes turned out in inclement weather onto poor pasture without supplementary feeding are most at risk. The risk is increased even more if the pasture has been dressed with a compound fertilizer containing potassium. This tends to lock up any available magnesium. Once again planning can help prevent a re-occurrence in future years.

Twin lamb disease occurs due to a failure of the ewe to meet the increasing demands for glucose by the rapidly developing foetuses. Both thin and excessively fat ewes can be affected.

Failure to monitor body condition score during the last two months of pregnancy is the main

reasons for flocks running into problems. Ewes losing body score should be investigated. Loss of condition may be due to inadequate diet, parasitism or debilitating disease.

In over-fat ewes fatty infiltration of the liver prevents the normal metabolic processes taking place. In addition over-fat ewes are usually housed and taking little exercise.

The key to controlling twin lamb disease is body condition scoring throughout pregnancy and making corrections. 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.

Scrapie

- Scrapie is a fatal brain disease of sheep and goats associated with prion protein
- 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. In most cases 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 Divisional Veterinary Manager for further investigation. Failure to comply can result in heavy fines or imprisonment. In addition scrapie compensation payments cannot be made.

If scrapie is diagnosed support for the flock owner

currently includes free genotype testing, compensation for slaughter animals and assistance towards the costs of buying replacement breeding rams that are highly resistant to scrapie. If the flock is affected by atypical scrapie the flock may be slaughtered and destroyed or intensively monitored for a period of 2 years after the last case.

Compensation is paid for suspect cases of scrapie, which are slaughtered for diagnosis under the control measures.

Most sheep show a gradual development of clinical signs over a period of several weeks or even months, although in some cases 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 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.

Planning for healthy sheep

Scrapie Monitoring Scheme (SMS)

Membership of this scheme enables flockowners to demonstrate compliance with the EU regulations concerning the export of breeding sheep, goats, semen or embryos to other EU states. In addition to adherence to a set of rules, flocks must undertake post mortem testing of culled or 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 Animal Health Divisional Office (AHDO)
- 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 as external lumps that are usually abscesses in lymph nodes
- Losses through culling of infected animals and whole or partial carcase condemnation
- CLA can affect animal condition, milk production and reproductive performance
- Highly infectious bacteria can survive in the environment for several months
- Present throughout UK and emerging now in the commercial sector
- The main costs of CLA in Wales is the loss of sales of breeding animals that become infected

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 Scotland, CLA was found to have been transferred between two flocks, through the temporary loan of one ram for the duration of the breeding season.

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, usually on a four-monthly basis.

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 to prove freedom from disease will then allow the owners of infected flocks to sell young breed stock with 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

Farm-specific problems

There are many other conditions such as watery mouth, lameness in young lambs, listeriosis in ewes and increasingly Jaagsiekte (Ovine

pulmonary adenocarcinoma) which require an individual approach during the planning stages and are based on previous history of losses.

Key steps to planning for healthy sheep

- Vaccination against clostridial disease and Bluetongue should be mandatory
- 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 can be reduced by good management
- If permanent ectoparasites are found on one animal the whole group should be considered infested and 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

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



Lame ram

Rams

- Lower fertility

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

Lame sheep – distinguishing different causes

Foot trimming is only necessary to help make a diagnosis; to improve the shape of grossly overgrown feet; to remove obviously loose horn before footbathing or other treatment. A good handling system makes foot examination less of a backbreaking job. Use a good pair of foot shears or a sharp knife. Trim carefully and conservatively.



Unnecessary bleeding due to over trimming

- Do not trim so hard that the foot bleeds - this is not necessary and may lead to permanent damage to the foot
- Take particular care at the toe - it is very easy to cut too deep

What are the common causes of lameness?

Scald and footrot are the most important 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, for example in dirty housing. 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

- **Scald** - the skin of the cleft between the claws is inflamed, moist and swollen, but there is no separation or underrunning of horn. All age groups are vulnerable, often many animals being affected within a short time period. It is caused by a particular bacterium (*Fusobacterium necrophorum*) found commonly in the environment (so it can be eradicated), which spreads particularly in warm, damp weather.

- **Footrot** - this starts as scald between the claws, but the action of a second bacterium (*Dichelobacter nodosus*) leads 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. Footrot is an infectious disease that survives in the feet of infected sheep but 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

Lame sheep do matter!

- **Contagious ovine digital dermatitis (CODD)** - this is a fairly new and serious disease. The cause is not fully understood but is possibly associated with the bacteria 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. Consult your vet if you are concerned that your flock is affected.

- **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.



Shelly hoof

- **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

- **Pedal joint abscess** - this serious type of infection is particularly 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.



Granuloma result of overparing

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

Lame sheep - treatment

Treatment of foot lameness

Scald, footrot and CODD need to be treated as flock problems, since only picking out individual lame animals for treatment is highly unlikely to result in satisfactory control. 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.

- **Paring** - this should be carried out with care, sufficient only to remove obviously loose horn before footbathing. It should not be done so severely that the foot bleeds.
- **Footbathing** - this is the most effective way of treating scald and footrot on a flock basis. Stand-in pens, which can hold a number of
- **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.
- **Antibiotic and other sprays.** Effective against scald and mild footrot, particularly for individual or small numbers of sheep. Not to be used

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. Standing sheep on a hard dry surface for up to one hour after footbathing will increase the efficacy of treatment.



Stand-in foot bath

Several different chemicals are available. The best known are:

Lame sheep do matter!

with footbathing as it gets washed off and is just a waste of money!

- **Antibiotic injections.** Can be very effective for severe 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 you are unlucky enough to already have that in the flock. By keeping these under control and not allowing advanced or chronic cases to develop much less time will need to be spent on treatment of individuals. 'Routine' foot paring mostly becomes unnecessary – this has, in any case, been shown to often cause more harm than good if feet are damaged and infection is spread in dirty handling pens.

The keys to prevention are:

- **Trimming** - only grossly overgrown horn. Routine trimming of all feet is not necessary.
- **Routine footbathing** - particularly helpful in warm weather, as well as before and during housing, to protect against scald and to prevent footrot spreading.
- **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. Vaccination may also help prevent at least one type of joint infection in lambs. 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** - as these act as a constant source of infection for others.



Routine trimming – good handling system

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.

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



Sheep abortions

- Abortion causes losses of at least £100 per ewe
- The three main causes of abortion are Enzootic abortion (EAE), Toxoplasmosis and Campylobacteriosis
- 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. The major 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 veterinary surgeon 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 is highly infectious as are discharges from the ewe.

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. However if only bred as shearlings the risk of abortion is greatly reduced. Rams are not implicated 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 the first year 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. In the face of an outbreak antibiotic treatment with high doses of oxytetracycline at 20 mg/kg 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 vaccine. There are live and inactivated vaccines so seek advice for the most appropriate for your flock.

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.

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

Sheep abortions

Toxoplasmosis

The second commonest cause of abortion in Welsh flocks is Toxoplasmosis. This is more commonly associated with upland and hill flocks. 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 2000 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 reduce 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.

Fortunately sheep infected with EAE and Toxoplasmosis can be identified retrospectively by blood testing.

Campylobacteriosis

The third commonest cause of abortion and getting more common is campylobacteriosis. This is caused by two closely related bacteria *Campylobacter fetus* sub-species *fetus* and *C. 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. 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.

Management is key to reducing the risk from campylobacteriosis. In addition good hygiene at lambing with the immediate removal of any ewe which has aborted to an individual or sick pen minimises 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
- Re submit if the first is negative
- 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 veterinary surgeon 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 and those of childbearing age should not be involved with sheep at lambing time and should not come into contact with dirty infected overalls





Flock Security (biosecurity)

Flock security is an important aspect to maintaining or improving the profitability of a flock. But it also includes the physical security of the flock.

In the lowland situation ring fencing to prevent sheep either wandering out or neighbours 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. Much of Wales is common grazing and herein lies the biggest problem. The health status of the sheep on common grazing is determined by the lowest denominator. It only needs one poor owner to cause untold problems to the others. Good co-operation between graziers is the answer.

The biggest risk to the flock is the buying in of replacement breeding stock and rams. Buyer beware!

Two sources are available one is by private sale farmer to farmer the other is via a market. The best looking pen 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.

The most costly are the importation of:

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

In addition jaagsiekte (ovine pulmonary adenocarcinoma) appears to be spreading amongst Welsh flocks, unfortunately there is no test available to determine if a sheep is infected. In particular it is the impulse buying of a good looking pen of ewe lambs or shearlings that can lead to a huge problem in later years.

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. In those 21 days consider the points on page 34.

Flock Security (biosecurity)

Things to consider

1. It must be assumed that any sheep coming onto a property from whatever source is infected or carries scab mites
2. All oncoming sheep have the potential to carry resistant internal parasites (worms) and fluke which are resistant to one or more of the common treatments
3. Although sound at the time of purchase sheep could be carrying footrot
4. Again at time of purchase sheep can appear free of CODD but the stress of movement will sometimes initiate disease
5. Enzootic abortion (EAE) can be introduced by latently infected ewes

On arrival all sheep must be treated for scab, resistant worms and footrot and closely observed for any other disease such as CODD. There is no way of identifying EAE in latently infected ewes.

A convenient way to treat for scab and resistant worms is to inject the sheep with an endectocide such as moxidectin and sequentially dose with a levamisole based product.

Alternatively sheep can be sequentially orally dosed with an endectocide and levamisole followed by plunge dipping in an organo-phosphorus (OP) dip. This controls two of the major economic conditions frequently introduced into flocks.

The incoming sheep should be footbathed in 3% formalin or 10% zinc sulphate at least three times at five days intervals during the 21 day quarantine.

At the same time the incoming sheep can be brought into the various vaccination regimes to which the resident flock is subjected.

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

Some diseases are impossible to prevent by physical means such as Bluetongue, thus an adjunct to flock security includes vaccination against these diseases.

Remember that incoming sheep are not the only threat to flock security. Sheep scab mites and chewing lice 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.