

**Veterinary Sciences Division**

# **Healthy Sheep, Healthy Profits**



*DEPARTMENT OF AGRICULTURE  
FOR NORTHERN IRELAND*

## **HEALTHY SHEEP, HEALTHY PROFITS**

**This booklet contains a compilation of articles which is based on presentations made during the two series of Roadshows entitled “Healthy Sheep, Healthy Profits”. The first series of Roadshows concentrated on the theme of management and diseases of the pregnant ewe. The second group of meetings focused on management of the ewe and lamb around lambing time including reducing mortalities in new-born lambs and worming and vaccination strategies. Representatives of the Ulster Farmers Union (UFU), the Northern Ireland Agricultural Producers Association (NIAPA), the Association of Veterinary Surgeons Practising in Northern Ireland (AVSPNI), the North of Ireland Veterinary Association (NIVA) and Department of Agriculture for Northern Ireland (DANI) were all represented on the Working Group which formulated the content of the Roadshows.**

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## FOREWORD



**Lord Dubs**

Sheep diseases such as infectious abortion, parasitic conditions and metabolic diseases can cause major economic loss both to individual farmers and to the agricultural industry each year. Neonatal lamb losses can also have a major effect in reducing productivity on sheep farms. Furthermore, diseases such as enzootic abortion can have important implications for human health.

It is in all our interests to see these losses reduced. Towards this end, a joint initiative between DANI and the Northern Ireland Farming and Veterinary Organisations has resulted in a series of roadshow meetings for farmers being held throughout the Province on the theme “Healthy Sheep, Healthy Profits”. These roadshows have taken place during the past two winters.

This booklet represents a compilation of the information presented at these meetings. It includes articles on management and nutrition, prevention and control of many important diseases both infectious and non-infectious, improvement of neonatal lamb survival and measures which can be taken to minimise risks of disease being introduced on to your farm. Several of the articles have been contributed by DANI staff and others have been provided by representatives of the Association of Veterinary Surgeons Practising in Northern Ireland (AVSPNI).

Veterinary practitioners, DANI and, above all, you as farmers have a critical role to play in reducing sheep losses and improving animal welfare. I hope you will find this booklet informative and a practical and useful guide towards improving the profitability of your sheep enterprise.

A handwritten signature in black ink that reads "Alf Dubs". The signature is written in a cursive, flowing style.

LORD DUBS

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# MANAGEMENT OF THE BREEDING EWE AT MATING AND IN EARLY PREGNANCY

*DANI Farm Development Division Beef/Sheep Advisers*

The main factor which determines the profitability of any sheep enterprise is the number of lambs reared per ewe. For example, in a 200 ewe flock selling 20 kg lambs at £2.45 per kg, a drop in the number of lambs reared per ewe from 1.25 to 1.05 will cause a 16% decrease in the income from lamb sales. This is illustrated in the table below.

	Low	Average	Good
Rearing percentage	105	125	145
Value of lambs sold	£10,290	£12,250	£14,210

\* £4,000 difference

In more general financial terms which clearly demonstrate that *lambs reared per ewe* has a major effect on profitability, flock owners should also note the following:

- For every 10 extra lambs per 100 ewes, the gross margin per ewe increases by £5;
- For every 10p/kg extra lamb dead-weight, the margin per ewe *increases* by £2.50;
- For each additional £20/tonne of concentrates, the gross margin per ewe *decreases* by £1.00.

As management of the ewe pre-lambing has a major effect on *lambs reared per ewe*, this article will concentrate on management prior to and during mating, management during the first month of pregnancy and during the 2 - 3 month period of pregnancy. Another article entitled, "Using records to improve profitability and feeding the ewe in late pregnancy", deals with the 4 - 5 month period of pregnancy and early lactation.

## ***Pre-Mating and Mating***

You should make sure that ewes are fit and at the correct condition for mating, that is, in good condition but not overfat (condition score 3). Condition scoring is the simplest and most practical indicator of nutritional status and, if carried out at regular intervals, can help you take effective early action to remedy overfatness or thinness of the flock. The sheep advisors of DANI's Farm Development Division can advise you further on this matter.

A pre-mating check on the condition of individual ewes needs to be carried out at least one month before mating. Thin ewes can then be segregated and their diet supplemented to bring them up to the correct condition for mating. Checking the condition of the flock can be combined with foot paring and, where necessary, any pre-mating vaccination programme.

During and prior to mating, flush the ewes on good grass and avoid sudden changes in diet at mating.

Check that rams are fit on their feet and are fertile. It is well worthwhile having your rams' fertility tested by your veterinary surgeon as up to 40% of rams have been shown to be less fertile than they should be, with 10% of all rams being totally infertile. Use one mature ram per 30 - 40 ewes, but only use 15-20 ewes per ram lamb.

### ***Early Pregnancy***

The first four weeks of pregnancy is a critical time. For the first two weeks, the embryos 'float' and it is only during the following two weeks that they attach themselves to the uterus. Therefore, sudden changes or stress during this period should be avoided *at all cost* as even relatively minor events can cause death of the embryos. In one study, there was a 25% reduction in the number of lambs born per ewe where the ewes were brought-in by a dog and foot-bathed i.e. 1.25 lambs per ewe compared to 1.7 in a control group.

If ewes are too thin at mating, this will also lead to a high embryonic mortality during early pregnancy. In fact, embryonic mortality can be three times higher than normal if ewes are too thin. The results from one study on embryonic mortality, which are shown in the following table, illustrate this point.

	<b>Scotch Blackface</b>		<b>North Country Cheviot</b>	
	Fit	Too Thin	Fit	Too thin
Body Condition Score	3	1.5	3	2
Embryonic Mortality %	15	50	18	40

If grass is scarce around the mating period, you should consider feeding some meal rather than allowing ewes to get into poor body condition. Feed 0.25 kg per day of concentrates (cost 15-20 pence per ewe per week) or as an alternative you can feed straights, such as sugar beet pulp or corn gluten, under such circumstances.

Remember, the first 4 weeks of pregnancy are ***critical*** and the aim is to avoid stress caused by underfeeding, overfeeding, handling and dipping. It is also advisable to provide adequate shelter to limit the stress caused by any adverse weather during this period.

### ***2 - 3 Months of Pregnancy***

This period of pregnancy is a less critical time, but it is important to continue to monitor the condition score of ewes. Do not allow thin ewes to lose condition. Fit ewes can be allowed to lose up to 0.5 body condition while fat ewes which are over condition score 3.5, will benefit from losing 0.5 body condition.

Remember! By following the above guidelines you will sell more lambs per ewe and thus improve the profits from your flock. Finally, it is only by keeping good records that you will know how your flock is performing.

## **KEY POINTS**

- Keep good records so you can see how your flock is performing.
- Use monthly condition scoring to monitor the nutritional status of your flock.
- Ensure ewes are in the correct condition for mating - fit not fat.
- Ensure your rams are fertile and you have an adequate number to cover the flock.
- Avoid disturbing the flock during early pregnancy.

# METABOLIC DISEASE OF THE PREGNANT EWE

*Maurice McCoy MVB, MRCVS  
DANI Veterinary Sciences Division*

Twin lamb disease and hypocalcaemia (low blood calcium) are the two most important metabolic diseases of ewes during late pregnancy.

## **TWIN LAMB DISEASE (PREGNANCY TOXAEMIA)**

Twin lamb disease occurs primarily in ewes carrying 2-3 lambs during the last 6-8 weeks of pregnancy, which is the time when 70-80% of foetal lamb growth occurs. In late pregnancy, the ewe can readily become energy (glucose) deficient because of this demand from the lambs. To help combat the low glucose level, the ewe starts to use her body fat for energy which produces ketones. It is the combination of low blood glucose and high blood ketones that results in the clinical signs of twin lamb disease.

The condition occurs in either thin ewes which have been undernourished or fat ewes which have been overfed during mid-pregnancy and will therefore have poor feed intakes in late pregnancy. Outbreaks of the condition are associated with any stressful event or management change which causes an interruption in feeding such as bad weather, dietary change, transportation or the presence of diseases such as foot-rot.

### *Clinical Signs*

Ewes with twin lamb disease stop eating, appear dull, dehydrated and become separated from the flock. They generally are easily caught! Over the next few days, clinical signs become more pronounced with blindness, teeth grinding, star gazing, muscle tremors and head pressing being commonly seen. Handling of affected sheep often makes the signs worse. If untreated, the ewe will go into a coma and die within 4-6 days.

### *Treatment*

The success rate of treatment tends to be disappointing. *Therefore, treatment has to be intensive and commenced early in the disease to stand any chance of success.* A variety of treatments can be used:

- Give a concentrated electrolyte/glucose solution by mouth every 4-8 hours until recovery;
- Alternatively, give glycerol or propylene glycol every 12 hours (60-100mls);
- Remember to avoid dehydration by giving the ewe plenty of water;
- Your veterinary surgeon can give intravenous glucose injections;
- To save the ewe, it may be worth considering early delivery of the lambs (induction of lambing or delivery by caesarean section).

## ***Prevention***

Twin lamb disease can be prevented by following good, sensible management practices:

- Examine ewes before mating and cull old ewes as well as ewes with health problems such as poor teeth, bad feet or those prone to vaginal prolapse;
- Consider scanning ewes to estimate the number of lambs they are carrying;
- Regularly monitor body condition score of ewes;
- Group ewes according to condition and/or number of lambs and feed accordingly;
- Avoid excessive weight gain in mid-pregnancy as this leads to poor feed intakes in later pregnancy;
- Feed additional good quality concentrates over the last 6-8 weeks of pregnancy;
- Allow adequate trough space (18 inches per ewe) and monitor feeding so that all ewes in a group are getting similar amounts;
- Feed concentrates twice a day, as this will keep overall dietary intake of forage and concentrates high. In addition, feed at the same time each day;
- Avoid sudden management/dietary changes and provide shelter from bad weather;
- Provide adequate clean water and allow space for ewes to exercise, if possible;
- Any concurrent disease problems such as foot-rot should be treated immediately.

## **KEY POINTS**

- Twin lamb disease affects ewes in late pregnancy. Affected ewes initially stop eating, appear dull and become separated from the flock. Then blindness, teeth grinding and head pressing are followed by death within 4-6 days.
- Treatment with energy supplements has to be intensive and started early in the disease to stand any chance of success.
- Control involves grouping ewes according to needs, avoiding stress and feeding them good quality concentrates in the last 6-8 weeks of pregnancy.

## **HYPOCALCAEMIA**

Hypocalcaemia, or calcium deficiency, is commonly seen in older ewes during the last six weeks of pregnancy when there is a huge demand for calcium from the unborn lambs. Ewes are unable to absorb sufficient calcium from their diet to meet this demand and therefore use calcium from their own skeleton to cover for this deficit. Any stress or abrupt management change during late pregnancy can upset this delicate balance and lead to outbreaks of hypocalcaemia.

## ***Clinical Signs***

Hypocalcaemia has a sudden onset with the affected ewe starting to stagger and show muscle tremors. This quickly progresses to recumbency. Frequently, the ewe will lie on its breast-bone with its head stretched out on the ground and its hindlegs extended backwards. If left untreated, coma and death follow within 6-12 hours.

## ***Treatment***

Injectable calcium solutions, given subcutaneously or intravenously are effective, if given early enough. Intravenous calcium, which can be given by your veterinary surgeon, will tend to produce a rapid response with the ewe able to stand within 5-10 minutes. Calcium which is given under the skin should be warmed first to help absorption.

## ***Control***

Control of hypocalcaemia is difficult as many factors come into play, particularly *stress*. Control measures include:

- Providing shelter and adequate feeding during bad weather;
- Avoiding, where possible, any *abrupt* change in management of the flock including feeding, housing, transportation or handling;
- Ensuring adequate, but not excessive, calcium in the diet (for example, avoid using high calcium mineral supplements);
- Recently, high dietary potassium concentrations have been implicated as a possible factor involved in hypocalcaemia, so it is advisable to avoid high potash fertilizer dressings on land intended for grazing of ewes during late pregnancy.
- As control of hypocalcaemia is difficult, it is important to observe the flock closely during the risk periods especially following any management changes or bad weather, so that affected ewes can be treated quickly and successfully.

## **KEY POINTS**

- Hypocalcaemia (calcium deficiency) is commonly seen in older ewes during the last six weeks of pregnancy. The condition is sudden in onset, with staggering, quickly followed by recumbency and death within 6-12 hours.
- Response to intravenous calcium injection is rapid with the ewe usually able to stand within 5-10 minutes.
- Control is difficult as stress plays a major role but any *abrupt* change in management of the flock should be avoided and the flock should be closely observed during the risk period.

# USING RECORDS TO IMPROVE PROFITABILITY AND FEEDING THE EWE IN LATE PREGNANCY

*DANI Farm Development Division Beef/Sheep Advisers*

## RECORDING AND USING INFORMATION

Recording and effectively using the information will improve profitability of your sheep flock. Do you know how your flock is performing? In an earlier article, we stated that the main factor which determines the profitability of a sheep enterprise is the number of lambs reared per ewe. Do you know the total number of lambs lost in your flock and why they were lost?

Carefully consider Table 1 which shows the 1996/97 gross margin results for breeding ewes in lowland and disadvantaged areas.

**TABLE 1: 1996/97 GROSS MARGIN RESULTS FOR BREEDING EWES**

Performance level	Lowland Flock		Disadvantaged Area Flock	
	Good	Poor	Good	Poor
Output	£	£	£	£
Lambs	71.72	58.59	72.09	50.60
Wool	3.10	3.00	2.87	2.60
Sheep Annual Premium	11.40	10.30	22.30	21.90
Flock Replacement	-0.72	-2.49	-4.86	-5.30
<b>Total</b>	<b>85.50</b>	<b>69.40</b>	<b>92.40</b>	<b>69.80</b>

Variable Costs	£	£	£	£
Concentrates	7.64	13.83	9.50	6.45
Forage and Grazing	11.90	12.39	13.50	13.25
Vet & Medicine	5.58	6.79	3.62	2.70
Sundries	1.58	1.69	1.78	1.10
<b>Total</b>	<b>26.70</b>	<b>34.70</b>	<b>28.40</b>	<b>23.50</b>
<b>Gross Margin</b>	<b>58.80</b>	<b>34.70</b>	<b>64.00</b>	<b>46.30</b>

The gross margin was 69% higher (£24.10 per ewe) for the best performance lowland flocks compared to poor performance lowland flocks. For flocks in disadvantaged areas, the difference in gross margin was less but still substantially higher for good performance flocks (38% or £17.70 per ewe).

In other words, a flock performing well in a disadvantaged area will sell an extra £21.49 worth of lamb annually per ewe compared to a flock performing poorly. From the records, it can be determined that this was achieved due to a number of factors. Most importantly, there were 27 more lambs produced at birth per 100 ewes put to the ram (153% versus 126%). Also 5% fewer lamb deaths occurred from birth to weaning (6.1% versus 11.3%). It is important to examine all aspects of the flock and to use comparable flock averages to highlight strengths and weaknesses.

Once the information has been collected and examined, it can form the basis for targeting specific areas within the enterprise which can be improved.

## CONCENTRATES IN LATE PREGNANCY

Late pregnancy is a critical period as ewes may increase their weight by about 20% because of placental and foetal development. Remember that 65 - 75% of foetal growth occurs during the last 6 weeks of pregnancy. The problem faced in late pregnancy is to increase the feed intake of the ewe at a time when there is a decrease in the available space in the ewe's abdomen due to the pregnancy. The ewe needs to increase her energy intake to approximately double her maintenance level during this time. For example, for a 70 kg ewe, the daily maintenance energy allowance increases from 8 MJ to 16 MJ in late pregnancy. Additionally, the heavily pregnant ewe requires extra protein for foetal growth, udder development and colostrum production. A proportion of this protein supplement should be in the form of rumen undegradable protein such as fish meal.

In late pregnancy, one *cannot* expect to fulfil energy and protein requirements from hay or silage alone. Hay or silage feeding needs to be supplemented with a good quality concentrate ration. A good quality concentrate ration is balanced with the correct minerals and vitamins, is high in energy (at least 30% cereals) and has approximately 30% of the protein fraction in the form of undegradable proteins. There are many proprietary sheep compounds which will meet this specification. However, for those interested in home mixing, two suitable rations for ewes in late pregnancy and in early lactation are given in Table 2.

It is important to regularly monitor the condition score of ewes and group them according to condition and the number of lambs they are carrying. The level of concentrate feeding depends on the body condition of the ewe but concentrates should be introduced by 6 weeks prior to lambing. Thinner ewes (condition score 2) require to be started on concentrate feeding earlier than those which have maintained a satisfactory body condition (condition score 3). Table 3 details an example of the recommended feeding levels for a cross-bred ewe carrying twins.

The level of feeding prior to lambing and during lactation is also dependent on the quality of forage and concentrate. If the silage has been analysed, the exact quantity and quality of concentrate required can be determined. A flat rate feeding system can also be effective (for example, 0.4 kg per head per day for a crossbred ewe, condition score 3 and carrying twins).

**TABLE 2: EXAMPLES OF SUITABLE HOME-MIX CONCENTRATE RATIONS FOR PREGNANT/LACTATING EWES.**

	Example 1		Example 2	
<b>Ingredients</b>	Whole Barley	250kg	Maize Gluten	450kg
	Whole Maize	150kg	Sugar Beet Pulp	300kg
	Citrus Pulp	250kg	Whole Barley	150kg
	Maize Gluten	100kg	Fish Meal	50kg
	Soya Bean Meal	175kg	Molasses	25kg
	Fish Meal	50kg	Mineral/Vitamin	25kg
	Mineral/Vitamin supplement	25kg	supplement	
<b>Approximate cost per tonne</b>	£140 per tonne		£115 per tonne	
<b>ME content</b>	12.5 MJ		12.5 MJ	
<b>Protein content</b>	21%		19%	

**TABLE 3 : CONCENTRATE REQUIREMENTS WITH GOOD SILAGE FOR A CROSSBRED EWE CARRYING TWINS**

Ewe Condition	Weeks prior to Lambing				Lactation
	8 - 6 weeks	6 - 4 weeks	4 - 2 weeks	2 - 0 weeks	
2	0.2 kg	0.4 kg	0.8 kg	1 kg	1 kg
3	-	0.25 kg	0.5 kg	0.75 kg	1 kg

### CONCENTRATES AND GRASS SUPPLY FOR THE LACTATING EWE

Lamb growth rate in the first six weeks is dependent on the ewe's milk supply. The milk yield of the ewe is influenced by:

- The size of the ewe (bigger ewes generally produce more milk. However remember that big, well-fleshed ewes can produce ill-thrift lambs because they do not produce milk but look after themselves);
- Age (third to sixth lactation yields are the most productive);
- Number of lambs (ewes with twins yield 40% more milk than those with singles);
- Level of nutrition in late pregnancy to early lactation;
- Creep feeding (lambs receiving creep feeding do not require so much milk from the ewe).

Inadequate feeding leads to premature peak milk yields at 2 - 3 weeks instead of ideally at 3 - 5 weeks and results in subsequent lower total milk yields. The quantity of concentrate fed *after* lambing depends on the availability of spring grass, the number of lambs the ewe is suckling and her body condition.

Once grass sward height is maintained at above 4 cm, expensive concentrate feeding is hard to justify with the exception of the first week after lambing. Inevitably, ewes in full lactation will lose some condition but a high quality protein source helps them to mobilise body reserves efficiently.



Maintenance of a grass sward height of above 4cm will minimise the need for feeding concentrates.

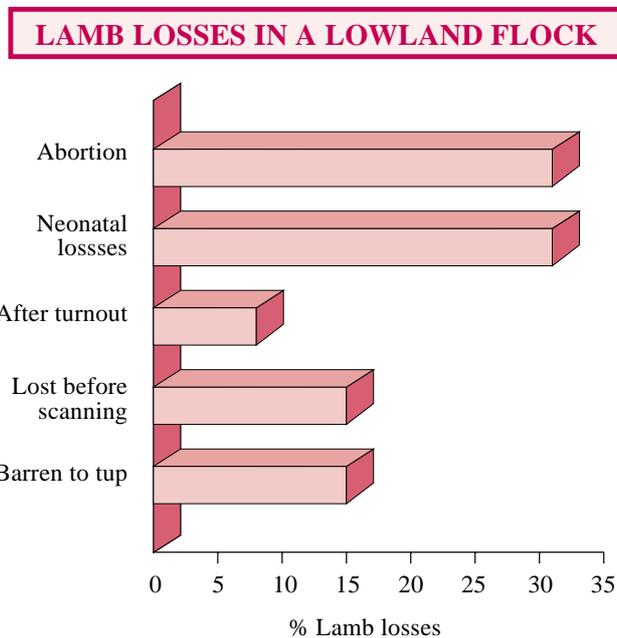
### KEY POINTS

- Recording and effectively using information will improve profitability.
- Supplement hay or silage with a good quality concentrate ration from 6 weeks before lambing.
- Once grass sward height is maintained above 4 cm, concentrate feeding for the lactating ewe is hard to justify with the exception of during the first week after lambing.

# ABORTION IN SHEEP: INVESTIGATION AND GENERAL CONTROL MEASURES

*David Harding BVM&S, MRCVS*  
*Association of Veterinary Surgeons Practising in Northern Ireland*

Abortion is a serious problem for sheep farmers in Northern Ireland especially with the recent introduction and spread of enzootic abortion of ewes (EAE). Almost one third of the lamb losses on lowland farms are due to abortion. Therefore abortion has a major effect in reducing profit margins on sheep farms. The financial penalty of abortion can be easily calculated. The percentage loss in gross margin for the flock is approximately double the percentage level of abortions. For example, if the level of abortion is 7% the gross margin of the flock decreases by 14%. While some abortions will occur naturally in flocks, it is prudent to investigate the cause of abortion in a proportion of cases, particularly when the abortion rate exceeds 5%.



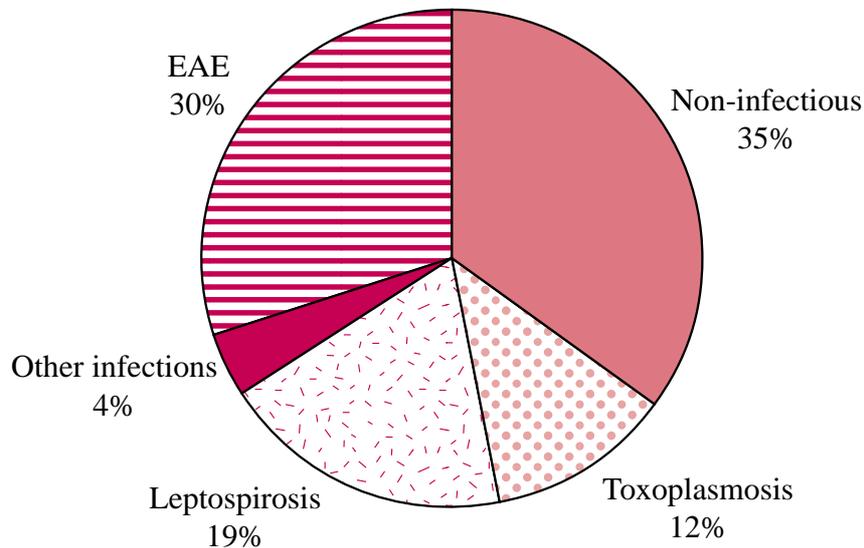
Abortion in sheep may be due to non-infectious causes as well as a number of infectious agents. Non-infectious causes of abortion are mainly related to management practices such as rough handling, inadequate feeding and dog worrying. These are prevented by using well trained staff and having properly designed handling facilities. Sheep should be handled as little as possible in the first and last month of pregnancy and changes of diet should be introduced gradually. Abortions may also be indirectly associated with concurrent sheep diseases such as pasteurilla pneumonia or liver fluke.

The main infectious causes of abortion are listed below. The first three agents (Chlamydia, Toxoplasma and Leptospira) are the ones most commonly associated with abortion outbreaks:

- Chlamydia (EAE);
- Toxoplasma;
- Leptospira;
- Listeria;
- Campylobacter;
- Salmonella.

The control and treatment of the various causes of abortion in sheep differs, so it is essential to obtain a definitive laboratory diagnosis. Early diagnosis is crucial in limiting the spread of disease. Fresh abortion material, including both afterbirth and lamb foetuses, should be submitted through your veterinary surgeon to a veterinary laboratory. There may be more than one cause of abortion present in a single flock so it is recommended that at least 10% of all subsequent abortions should also be examined.

### CAUSES OF SHEEP ABORTION IN NORTHERN IRELAND



#### *Control of abortion*

There are general measures that can be applied to control all types of infectious abortion. These include:

- Removal and proper disposal of aborted lambs, afterbirth and bedding;
- Disinfection of pens and surroundings with a disinfectant approved by DANI<sup>1</sup>;
- Isolation and tagging of aborting ewes;
- Identifying the cause of abortion by sending aborted/stillborn lambs, afterbirth and blood samples from the ewe to a veterinary laboratory. This is essential as it is the only way to identify the cause of abortion;
- Maintaining a self contained flock or buying replacements directly from one known supplier.

More specific control measures can be used once the cause of abortion within a flock has been identified. The strategies for the control of the main infectious causes of abortion are outlined in the next article of this booklet, but specific abortion problems should be discussed with your local veterinary surgeon.

<sup>1</sup> An up-to-date listing of DANI approved disinfectants is available from your local Divisional Veterinary Office.

### ***Risk to human health***

There is also a significant threat to the health of farmers and their families from some of the infectious causes of abortion and these are listed in the following table. It is particularly important that pregnant women have no contact with the flock before and during the lambing period.

A high standard of personal hygiene is called for to protect your family and yourself. It is advisable to wear disposable gloves when assisting with lambings, particularly when delivering premature lambs. Gloves should also be worn when handling abortions, dead lambs and afterbirths as cuts on hands will allow the infection to enter. Outer clothing and boots should be removed before entering the home. Waterproof clothing and boots should be washed and then sponged down with disinfectant. Hands should be thoroughly washed with soap and water prior to eating or drinking.

### ***Human health problems which can be caused by sheep abortion agents***

<b>Infectious Agent</b>	<b>Symptoms in humans</b>	<b>Comments</b>
Chlamydia (EAE)	Abortion in pregnant women.	Pregnant women should avoid contact with sheep. Good standard of personal hygiene when handling abortion material. Due care when handling EAE vaccine.
Toxoplasma	Abortion in pregnant women. Foetal defects.	Pregnant women should avoid contact with sheep. Good standard of personal hygiene when handling abortion material. Due care when handling toxoplasma vaccine. Other potential sources of human infection are poorly cooked meat and cat faeces.
Leptospira	Severe 'flu-like' illness.	Good standard of personal hygiene when handling abortion material.
Salmonella	Mild to severe vomiting and diarrhoea.	Good standard of personal hygiene when handling abortion material. Particularly dangerous to children and the elderly.
Campylobacter	Diarrhoea.	Good standard of personal hygiene when handling abortion material.
Listeria	Abortion in pregnant women.	Meningitis/encephalitis. Pregnant women should avoid contact with sheep. Good standard of personal hygiene when handling abortion material.

In summary, control of abortion is always beneficial to both profit margins and to the provision of a safer working environment. Sheep farmers have only one chance each year to get a return from the ewe and the extra time and money invested in preventing and limiting abortions will be amply rewarded.

### **KEY POINTS**

- Only buy replacements directly from a known supplier.
- Remove abortion material and bedding and disinfect the area.
- Isolate and tag aborting ewes.
- Submit abortions to a veterinary laboratory so the cause of the problem can be correctly identified.
- Remember that some organisms causing sheep abortion can infect humans and so use of hygienic practices is essential.

# ABORTION IN SHEEP: SPECIFIC CONTROL MEASURES

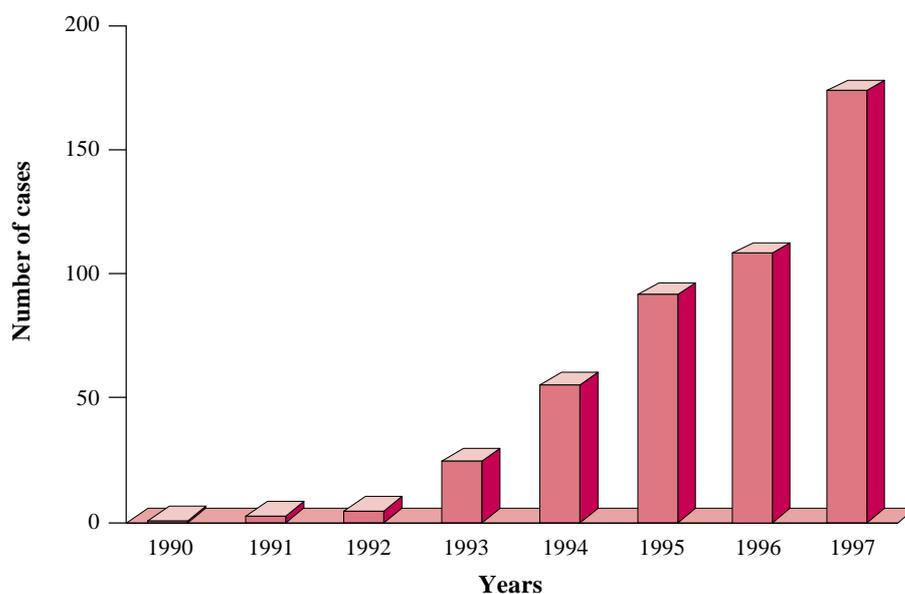
*Frank Malone MVB, MBA, FRCVS  
DANI Veterinary Sciences Division*

The first article in this booklet provided information on the general control measures in cases of sheep abortion which should be implemented to limit the spread of infection to other sheep and to humans. The article also stressed the need for laboratory identification of the cause of an abortion problem as measures for control and treatment of the various causes of abortion can differ depending on the agent concerned. Specific treatment and control measures for the six main infectious causes of abortion are covered by this article.

## ENZOOTIC ABORTION OF EWES (EAE)

EAE, which is caused by the organism *Chlamydia psittaci*, can result in either abortion or the birth of weak or apparently normal lambs with infected afterbirth. EAE was not diagnosed in Northern Ireland flocks before 1990. Since then, there has been a dramatic increase in the number of cases of EAE and it now causes approximately one third of all sheep abortions diagnosed by DANI's Veterinary Sciences Division.

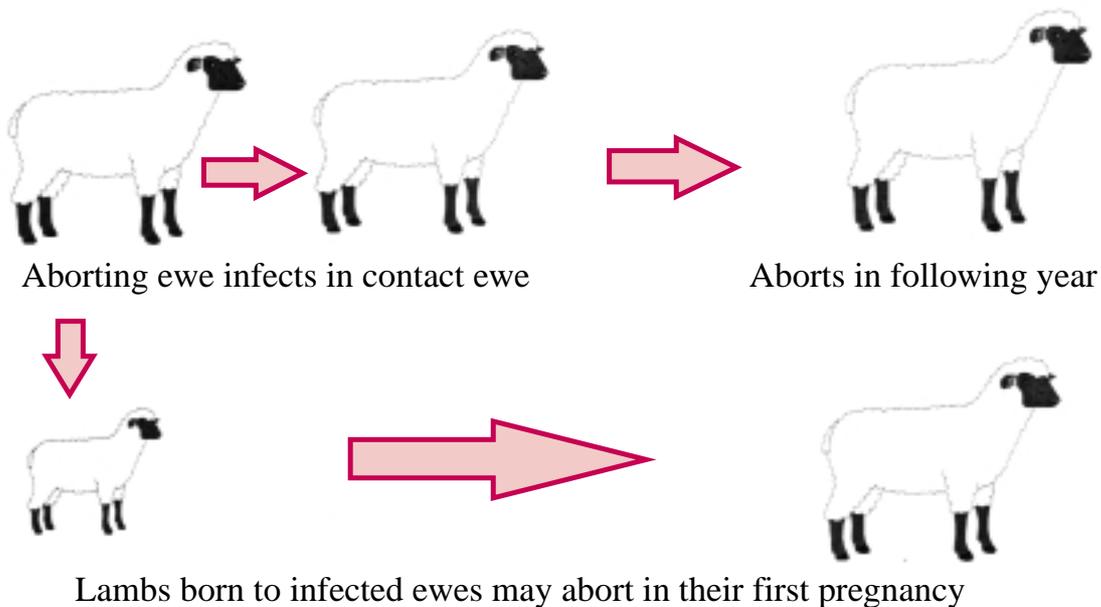
**ANNUAL NUMBER OF EAE CASES DIAGNOSED, 1990-1997**



### *Spread of EAE*

The infection is usually introduced into a flock by the purchase of an infected ewe. This ewe, which may abort or lamb normally, spreads the infection to other susceptible ewes in the flock through the afterbirth, birth fluids and discharges from the birth canal. Although it is possible for ewes to become infected and abort in the same lambing season, abortion normally occurs in the following lambing season. Ewe lambs, which are born to EAE infected ewes, will harbour the infection and may abort during their first pregnancy. EAE does not survive for more than a few days in the environment so the main source of infection is an infected ewe at lambing time. The infection spreads more readily when ewes are housed for lambing and this is why EAE is more common in lowland flocks. Purchased foster lambs may also introduce the infection in closed flocks.

## SPREAD OF EAE



### *Control of EAE*

In the face of an outbreak of EAE abortion, treatment with long acting antibiotics will control but not eradicate the infection. It is important to limit the spread of infection to susceptible ewes by proper disposal of all abortion material and isolation of the aborting ewes for 2-3 weeks. Bedding contaminated with aborted material should be removed and the area disinfected with an approved disinfectant. Where EAE is suspected, it is not advisable to use aborted ewes to foster orphan lambs.

In flocks where EAE has been diagnosed, ewes and ewe lambs should be vaccinated against EAE between 1-4 months before tugging. This vaccination should be repeated after two years to maintain a good level of protection. It is important to realise that ewes, infected during the previous lambing season, and incubating EAE may still abort despite vaccination. The EAE vaccine is a live vaccine and therefore may have the potential to infect humans and so it is important to follow the manufacturer's instructions when giving the vaccine.

### **TOXOPLASMOSIS**

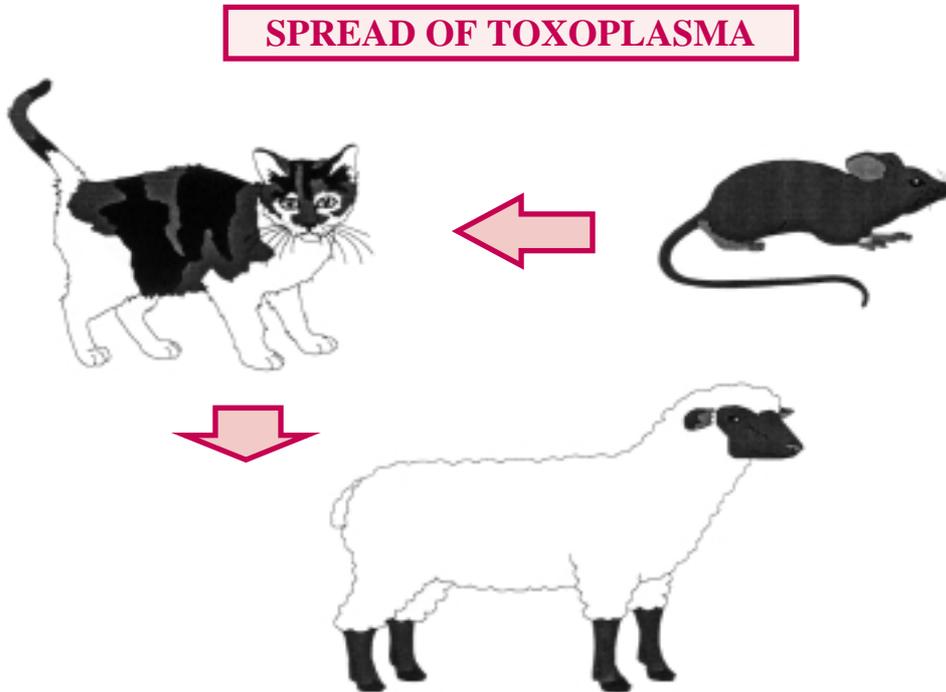
Toxoplasmosis, due to *Toxoplasma gondii*, is also a major cause of abortion. It has a very different means of infection compared to EAE in that toxoplasma infection is *not* spread from sheep-to-sheep. Sheep are normally infected by eating feedstuffs which have been contaminated by cat faeces containing toxoplasma oocysts (eggs).

### *Signs of toxoplasmosis*

Clinical disease occurs when sheep become infected for the first time while they are pregnant. The outcome depends on the age of the foetus when first infected. In early pregnancy this may result in foetal death and resorption which will present as barren ewes. Infection with toxoplasma in mid-pregnancy will present as losses due to abortion, stillbirths or mummified foetuses. Infection in late pregnancy may cause the birth of weakly, full-term lambs.

### *Spread of toxoplasmosis*

The central role in toxoplasma spread is played by the young hunting cat acquiring infection for the first time from its prey. The cat then passes large numbers of toxoplasma oocysts in its faeces for up to two weeks. Toxoplasma oocysts are very resistant and may persist in the environment for up to a year. Therefore, although cats will only shed the infection for a short time, any place where they have fouled during this period (such as in a grain store) will be contaminated with toxoplasma.



### *Control of toxoplasma abortion*

Because the infection is caused by faecal contamination of feedstuffs by cats, it is important to keep stored feedstuffs covered and to control the cat population by neutering. After infection, the ewe will develop a strong natural immunity. Medication in the concentrates will control toxoplasma abortion but this should be undertaken only on the advice of your veterinary surgeon. Vaccination against toxoplasma abortions will give life long immunity. The vaccine needs to be administered 3-12 weeks before tugging. As toxoplasmosis occurs more commonly in younger breeding ewes, it is more cost effective to vaccinate first breeding ewes.

The toxoplasmosis vaccine currently available is a live vaccine and can therefore also infect humans, so the manufacturer's instructions for use should be carefully followed.

## **LEPTOSPIROSIS**

Leptospiral abortion in sheep, due to *Leptospira hardjo*, is commonly diagnosed in Northern Ireland. Leptospiral abortion is seen in ewes introduced from extensive to intensive flocks in their first lambing season following introduction, but not in subsequent years. The infection may be passed from sheep-to-sheep, cattle-to-sheep and from sheep-to-cattle.

### ***Signs of leptospiral abortion***

Disease is usually seen in intensively managed lowland flocks. It is rarely diagnosed in traditionally managed hill flocks. Leptospiral infection causes late term abortion, stillbirths and weakly lambs and has also been associated with agalactia (no milk in udder) in ewes shortly after lambing.

### ***Control of leptospiral abortion***

Antibiotics may be used to reduce losses in the face of an outbreak of leptospiral abortion. Advice on appropriate antibiotics may be obtained from your veterinary surgeon. In flocks where leptospiral abortion has been diagnosed in previous years, purchased ewes may be vaccinated with a quarter dose of the cattle *Leptospira hardjo* vaccine twice before tupping. The cattle leptospiral vaccines are not licensed for use in sheep and therefore can only be used at your veterinary surgeon's discretion. As sheep may be infected by cattle, contact between pregnant ewes and cattle should be minimised.

## **LISTERIOSIS**

Listeriosis, due to *Listeria monocytogenes*, most commonly causes a brain disease in sheep but it may also cause abortions at any stage of pregnancy. Abortions due to listeriosis are associated with the feeding of poorly fermented silage.

Silage may be contaminated during ensiling with soil containing listeria and the organism may multiply in silage if the latter is poorly compacted or sealed. Sheep become infected by eating poor quality silage contaminated with listeria bacteria. There is no sheep-to-sheep spread of infection.



As outbreaks of listeriosis are associated with poorly fermented silage, particularly silage with pH values greater than 5, it is important that only good quality, well fermented silage is fed to sheep. The use of good silage harvesting techniques and production of well wrapped big bale silage are particularly important in preventing abortions due to listeriosis. Uneaten silage should be replaced daily with fresh silage.

## **SALMONELLOSIS**

Abortions due to salmonellosis are uncommon in Northern Ireland, but serious outbreaks have occurred in some flocks. The most common serotypes of salmonella isolated from abortion outbreaks are *S. typhimurium* and *S. dublin* which may also cause diarrhoea and deaths in ewes. Other serotypes of salmonella such as *S. montevideo* may cause abortion only.

Salmonellosis may be introduced into a flock by contaminated feed or water, wildlife or carrier sheep and cattle. Infected sheep spread the infection to other ewes in the flock and a high level of salmonella contamination can rapidly occur within a lambing shed.

Salmonella abortion may be controlled by administration of an appropriate antibiotic for which advice should be sought from your veterinary surgeon. Salmonella is highly contagious and abortion material and contaminated bedding should be incinerated or buried.

## **CAMPYLOBACTER INFECTION**

This bacterial infection is an occasional cause of abortion in sheep flocks and abortions storms are uncommon. Campylobacter abortion usually occurs in individual sheep in late pregnancy, about 7-25 days after infection. This infection may also cause stillborn and weakly new-born lambs.

Campylobacter infection may be introduced into a flock by carrier sheep, aborted material or by wildlife and is then passed from one ewe to another at the time of abortion. There is a good immunity following infection so aborting ewes may be retained for breeding. Outbreaks of campylobacter abortion may be controlled by antibiotic medication. Your veterinary surgeon will advise on the most appropriate treatment.

## **OTHER CAUSES OF ABORTION IN SHEEP**

Border disease, Q fever, tick borne fever and bacteria such as *Actinobacillus* species may also cause abortion in sheep. Abortions due to these agents are uncommon in Northern Ireland.

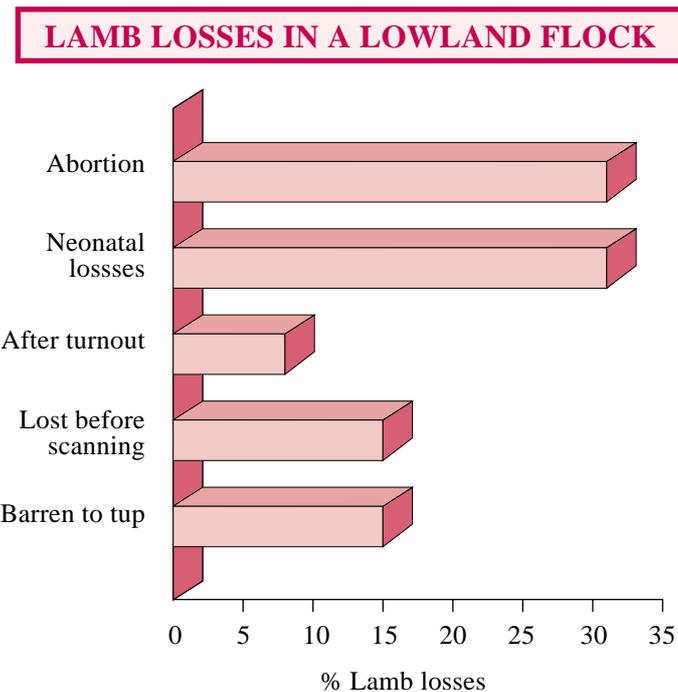
## **KEY POINTS**

- EAE, leptospirosis and toxoplasmosis are common causes of abortion.
- Laboratory identification of the cause of an abortion problem is critical to proper control and prevention.
- Medication can be used to control an abortion storm.
- Vaccination can be used to prevent abortions due to EAE and Toxoplasma.
- Discuss with your veterinary surgeon the best control methods for your flock.

# PREVENTION OF NEONATAL MORTALITY IN LAMBS

*Frank Malone MVB, MBA, FRCVS  
DANI Veterinary Sciences Division*

Neonatal lamb mortalities occur in the period from the birth of the lamb to 28 days of age and have a major effect in reducing productivity on sheep farms. Neonatal mortalities in hill flocks average 20% whilst those in lowland flocks normally range between 5-15%. The graph below indicates that about one third of all lamb losses in lowland flocks occurs during the neonatal period.



The main causes of neonatal mortality in lambs are exposure/starvation and infectious diseases. Hill lambs, which are reared under extensive conditions, are more prone to exposure/starvation, while infectious diseases are more common in lowland lambs, reared under intensive conditions.

## *Ewe Nutrition*

Events before and during birth have a substantial influence on neonatal mortality or survival. Over one third of neonatal deaths are due to events such as poor nutrition and infections which occurred during pregnancy. Nutrition of the ewe during pregnancy has a direct effect on the birth weight and maturity of the new-born lamb as both undersized and immature lambs are more susceptible to exposure/starvation. Since 70% of foetal growth occurs during the last six weeks of pregnancy, underfeeding of the ewe during this period may cause undersized lambs. Undernutrition also leads to inferior colostrum production, which is necessary to provide both energy and immunity for the new-born lamb. Good ewe nutrition is also important in the period 30-90 days after tupping when the placenta is most sensitive to poor nutrition. Insufficient placental development leads to a smaller lamb at birth. Ewes carrying twins or triplets should be preferentially fed during pregnancy.

## ***Lambing***

A difficult lambing, due for example to an oversized or malpresented foetus, may cause birth trauma. This may result in fractured ribs, ruptured livers or brain haemorrhages resulting in “stillbirths” or weakly lambs. Overfeeding of ewes carrying single lambs in late pregnancy may also lead to difficult lambings. Therefore, ultrasound scanning of ewes is a useful aid to correct feeding during pregnancy. Ill or debilitated ewes and those affected with pregnancy toxæmia are also more likely to have difficult lambings.

Bonding of the ewe and new-born lamb plays an important role in preventing mismothering which contributes to lamb deaths due to starvation/exposure. The ewe should be observed licking the lamb after birth and the lamb should be seen sucking colostrum.

## **HYPOTHERMIA**

Hypothermia (an abnormally low body temperature) may be due to exposure, starvation or a combination of both. Exposure/starvation is a major cause of neonatal lamb mortality, particularly for hill lambs in adverse weather conditions with inadequate shelter. Although all new-born lambs are liable to become hypothermic, those most susceptible are:

- Undersized or premature lambs;
- Weakly lambs which fail to suck;
- Lambs affected by a difficult lambing;
- Lambs from ewes in poor condition;
- Lambs from young or very old ewes.

The normal body temperature of a new-born lamb is 39°C. Lambs with a body temperature of 37-39°C are moderately hypothermic while temperatures below 37°C indicate severe hypothermia. Hypothermia is progressive and once body temperature has fallen by more than a few degrees, it continues to fall leading to coma and death.

The two main periods when new-born lambs are at risk from hypothermia are from birth to five hours old and also between ten hours to three days old.

### ***Birth to five hours old***

Hypothermia during this period is due to excessive heat loss caused by evaporation from the wet coat of a new-born lamb. Such lambs should be dried, warmed and fed colostrum. If the lamb is unable to suck, it may be stomach tubed with colostrum at a dose rate of 50ml/kg three times per day. When the lamb is active and sucking vigorously, it may be returned to the ewe in a sheltered pen.

### ***Ten hours to three days old***

Hypothermia during this period is generally due to starvation causing depressed heat production by the lamb. Severe weather conditions and lack of shelter may contribute to the hypothermia. Lambs affected by hypothermia during this period also have hypoglycaemia (low blood sugar). If the lamb is moderately hypothermic (37-39°C), it should be dried, fed with colostrum and returned to the ewe in a sheltered pen. A severely hypothermic lamb (below 37°C) should be given 10ml/kg of a warmed 20% glucose solution by intraperitoneal injection (into the abdomen). This is a valuable procedure which your veterinary surgeon can demonstrate to you. After the intraperitoneal injection of glucose, the lamb should then be dried, warmed and fed with colostrum.

When the lamb is active and sucking vigorously, it may be returned to the ewe in a sheltered pen. Resuscitated lambs which are too weak to be returned to the ewe must be kept warm, fed with colostrum or milk substitute and regularly inspected for signs of infectious disease. These lambs may be cared for in individual, well-bedded pens heated with an infra-red lamp to 20°C. If hypothermia recurs, the lamb should be given another glucose injection and warmed.

### ***Constructing a lamb warming box***

Warming of hypothermic lambs is efficiently and conveniently carried out in a lamb warming box heated to 40-45°C. This may be constructed as follows:

- Place paper sacks on the floor to make a square 2 metres by 2 metres.
- Make a square of bales as shown in the diagram.
- Make a tunnel between two bales on one side.
- Place a blower heater in the tunnel, lined with a funnel.
- Cover the bales with a wire mesh or expanded metal frame.
- Build another square of bales on top of the mesh.
- Cover the warmer with a clear plastic sheet.
- Place a thermometer on the wire mesh inside the warmer and heat using the blower heater to between 40-45°C.

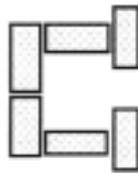
The temperature may be adjusted by modifying the controls on the blower heater or by opening a small hole in the plastic sheet.

To use the warmer, place the hypothermic lamb in the warmer near the thermometer. Check both the temperature of the lamb and the warmer every half hour. When the lamb's temperature returns to normal, it may be removed to well-bedded pens heated with an infra-red lamp to 20°C.

## LAMB WARMER

### Step One

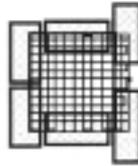
Place six bales  
on paper bag  
covered floor .....



Opening for  
heater (lined).

### Step Two

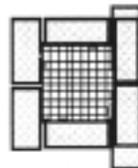
Place wire over  
bales to form  
the floor .....



Half-inch  
net-wire.

### Step Three

Place another six  
bales on top of the  
wire and the first  
rows of bales .....



Place heater  
in opening.

### Step Four

Cover with 1000 gauge polythene.

## INFECTIOUS DISEASES

Infectious diseases are responsible for between 10-15% of neonatal losses. Infections acquired during pregnancy, such as toxoplasmosis or leptospirosis, may lead to the birth of weakly lambs which are more susceptible to infections encountered after birth. Infectious diseases are more common in lowland flocks which are housed for lambing. The predominant infections seen in young lambs are:

- Clostridial disease
- Enteritis
- Watery mouth
- Joint ill
- Liver abscessation

### *Clostridial disease*

Pulpy kidney disease (enterotoxaemia) due to *Clostridium perfringens* type D is frequently diagnosed by DANI's Veterinary Sciences Division laboratories at Stormont and Omagh. Lambs with this disease are usually found dead, but occasionally may be seen exhibiting nervous signs immediately before death. Other clostridial diseases such as lamb dysentery or tetanus (lockjaw) are less frequently seen. An emerging clostridial disease, due to *Clostridium sordellii*, causes abomasitis (inflammation of the stomach) in 2-4 week old lambs. This disease is more frequently seen in early lambing flocks where the lambs are fed concentrate creep feed *ad lib.* Losses are usually sporadic and lambs are usually found dead with a distended abdomen.

There is no effective treatment for clostridial disease once clinical signs are seen. In acute outbreaks, antitoxins are available for the immediate protection of remaining lambs in the case of pulpy kidney disease, lamb dysentery or tetanus. There is no antitoxin available for *Clostridium sordellii*.

Clostridial diseases can best be prevented by ensuring that the ewe is properly vaccinated so that maternal antibody is transferred through the colostrum. Clostridial vaccination requires a primary course of two doses 4-6 weeks apart and an annual booster given four weeks before lambing commences. Currently only one vaccine offers protection against *Clostridium sordellii*.

### ***Enteritis***

Enteritis or scouring in new-born lambs may be due to a variety of infectious agents:

- ⇒ *E. coli*;
- ⇒ Cryptosporidium;
- ⇒ Rotavirus;
- ⇒ *Salmonella*;
- ⇒ Coccidia.

*E. coli* bacteria are associated with enteritis in the first three days of life. Cryptosporidium may cause enteritis from one to three weeks of age. Both *E. coli* and cryptosporidium infections are common in lowland flocks. Rotavirus enteritis is not as common in lambs as in calves, but may cause scouring in three to ten day old lambs. *Salmonella* causes a severe scour, with blood and occasionally the lining of the gut, in the faeces. Enteritis in lambs due to salmonellosis is uncommon in Northern Ireland, but serious outbreaks have occurred on individual farms. Coccidia infection (coccidiosis) is usually seen in older lambs often at 4-6 weeks of age, but occasionally occurs in 3-4 week old lambs.

Rational treatment and prevention of enteritis in lambs requires an accurate diagnosis. Therefore submission of scour samples from untreated lambs to a veterinary laboratory for examination is essential in enabling a definitive diagnosis to be made.

Both *E. coli* and *Salmonella* enteritis are treated by antibiotic and fluid therapy. Vaccination of the ewes before lambing should be considered if there is a history of *E. coli* enteritis in the flock. Primary vaccination is by two injections two weeks apart, the second injection given four weeks before lambing. Annual revaccination is necessary four weeks before lambing. The ewe's colostrum contains protection against these infections, so it is important to ensure that the lamb sucks sufficient colostrum. At present, only symptomatic treatment is licensed for cryptosporidium infection. However cryptosporidium infection may be prevented by ensuring the lamb gets sufficient colostrum and by maintaining good hygiene in the lambing shed.

There is a significant health risk to farmers and their families from both *Salmonella* and cryptosporidium infections. Therefore a good standard of personal hygiene is necessary when handling scouring lambs.

Coccidiosis is a disease which is more commonly seen in intensive flocks with most outbreaks occurring in lambs 4-6 weeks of age in housed flocks. The bedding of the sheep house becomes contaminated with coccidia from the faeces of adult sheep, which are immune to the disease. The udders of the ewes subsequently become contaminated, particularly if the bedding is wet or sparse, and the coccidia are swallowed by the lamb when sucking. There is a rapid multiplication of coccidia in the intestine of the lamb which leads to heavy contamination of the sheep house.

Lambs affected with coccidiosis may have a tucked-up abdomen and the rear end is stained with dark, watery faeces. In severe cases, the faeces may be streaked with blood. Depending on the stage of infection, coccidia may or may not be present in the faeces. Coccidiosis may be treated by medication of individual lambs with, for example, sulphonamides or by medication of the creep feed with decoquinate. It is important to break the cycle of infection by providing clean, dry bedding.

### ***Watery mouth***

Watery mouth is an infectious disease affecting lambs which are 12-72 hours old. It is seen in intensive lowland flocks and does not occur in hill flocks. Affected lambs are drowsy, drool saliva and frequently have a distended abdomen. The disease is thought to be caused by toxins released by *E. coli* organisms in the intestines. An early intake of adequate colostrum prevents watery mouth. However if an outbreak occurs, oral dosing at birth with appropriate antibiotics is effective in controlling the disease.



Ensure that lambing pens are clean and dry, lambs receive adequate colostrum and their navels are treated with tincture of iodine.

### ***Joint ill***

Joint ill is a bacterial infection of the joints of lambs which are less than one month old. Joint ill may be due to infection of the navel from contaminated bedding, or the lamb may become infected by aerosols of bacteria from the upper respiratory tract of the ewe.

Affected lambs are lame and there is pain, heat and a slight swelling in the joints. The knee and hock joints are most commonly affected. As the disease progresses, the lamb fails to suck and death occurs due to a combination of the bacterial infection and dehydration.

The disease may be controlled in some cases by good hygiene in the sheep house and by treating the navel of the new-born lamb with tincture of iodine. However in severe outbreaks, it may be necessary to administer long acting antibiotics to all new-born lambs. Joint ill can be successfully treated with the newer antibiotics if treatment is given early in the course of the disease.

### ***Liver abscessation***

Liver abscessation is a consequence of navel infection in new-born lambs. The bacteria causing the infection enter the liver via the umbilical vein from the lamb's navel. Affected lambs are tucked up in appearance and are reluctant to suck. Death usually occurs a few days after the lamb is seen ill. There is no treatment for liver abscessation and the disease is best prevented by good hygiene in the lambing shed and treating the navel of the new-born lamb with tincture of iodine.

### **KEY POINTS**

- Good nutrition of the ewe during pregnancy reduces neonatal lamb losses.
- The main causes of death in neonatal lambs are hypothermia, starvation and infectious disease.
- Hypothermia and starvation may be prevented by provision of shelter and ensuring that neonatal lambs are sucking vigorously.
- Lambs which have sucked sufficient ewe colostrum will obtain antibodies to help protect against infection.
- Good hygiene in the lambing shed and dressing the navel with tincture of iodine will help prevent infections.
- Vaccination for clostridial diseases should be carried out four weeks before lambing.

# SHEEP SCAB

*Robert Huey MVB, DVPH, MRCVS  
and Ignatius McKeown MVB, MSc, MRCVS  
DANI Veterinary Service*

Sheep scab is a highly transmissible, parasitic disease of sheep which can have disastrous consequences if it is introduced into a flock. The disease is *notifiable* which means that anyone who knows or suspects that a flock is affected with sheep scab, must inform the local Divisional Veterinary Officer of this suspicion. If the disease is confirmed, the flock can be effectively treated but this must be carried out under direct supervision from staff of DANI's Veterinary Service.

## *The disease*

Sheep scab has a severe effect on the welfare of sheep and causes economic loss. It is caused by the parasitic mite, *Psoroptes ovis*, which is barely visible to the naked eye. This mite causes intense itching and signs of the disease commence with the sheep rubbing against objects and nibbling at its wool. If the fleece is examined in the early stages of infection, areas of moistness, scab formation and yellowish staining of the wool can be seen.

In infested sheep, the condition will progress to extensive wool loss with scabs and pus appearing on the skin. By this stage, the affected sheep spend so much scratching that they cease to feed, lose condition and may eventually die, if the disease is left untreated. *It should be noted that neglecting to treat and control sheep scab is a welfare offence. Additionally, failure to notify an outbreak of sheep scab is also an offence.*

## *Methods of spread*

The disease is spread by unaffected sheep coming into contact with infested sheep or contaminated equipment. Sheep scab is usually introduced into a flock by:

- infested sheep being brought into a flock;
- contact with infested neighbouring sheep;
- infested straying sheep;
- contaminated equipment such as lorries, trailers, sheep shears, fences.

## *Treatment*

Sheep scab can be treated effectively using either an approved sheep dip or injection. Given the human health implications associated with using sheep dips, it is worth considering changing to the recently approved avermectin-type injection for the treatment of sheep scab. In order to achieve satisfactory results, it is essential to treat *all* sheep on a holding and to follow the treatment directions precisely. It is also necessary to prevent mixing of treated sheep with untreated sheep. Your local Divisional Veterinary Office will assist and advise flockowners on treatment and prevention of sheep scab.

## ***Health and Safety Considerations***

All sheep dips can be hazardous to the health of the operator, if they are used incorrectly. It is essential to handle dip concentrates with particular care. It is important to always take care when using sheep dips and to follow the manufacturer's instructions exactly. In general, the manufacturer's instructions for using sheep dip include:

- wearing proper protective clothing such as unlined synthetic rubber gloves, rubber boots, waterproof trousers or leggings and a waterproof coat or bib apron (made of nitrile or PVC);
- wearing a face-shield when handling dip concentrate;
- not smoking, drinking or eating while dipping;
- washing your hands and face along with any other exposed skin immediately after dipping and before any tea-breaks or meal-times;
- immediately washing off accidental splashes of dip;
- removing heavily contaminated clothing and washing or destroying it;
- washing protective clothing after each day's work.

Further information on how best to protect the health of all those involved in dipping sheep is available in a booklet entitled "*Sheep dipping*" which is available free of charge from HSE Books, PO Box 1999, Sudbury, Suffolk, C010 6FS (Telephone: 01787 8811650). Also, organophosphate dips may only be purchased and used by an operator who holds a "*Certificate of competence in sheep dipping*". Details of certificate courses on sheep dipping are available from the Agricultural Colleges.

Do not use organophosphate sheep dips if you have noticed any ill effects following their use, or if you are under medical advice not to work with such chemicals. There are alternative products which can be used. If you feel unwell after involvement in sheep dipping, you should contact your doctor. Any suspected adverse health effects thought to be connected with sheep dip should be reported to the Veterinary Medicines Directorate, Woodham Lane, New Haw, Addlestone, Surrey KT15 3NB (Telephone: 01932 336911; Fax: 01932 336618).

*Remember*, the wool of dipped sheep contains residues of the dip for several weeks after dipping so take precautions when handling dipped sheep.

## ***Protecting the environment***

All sheep dips are poisonous to animals, birds, fish, and other aquatic life. Recent studies have suggested that some sheep dips may be up to 1000 times more toxic to aquatic life than organophosphate dips. It is therefore very important that all sheep dips are disposed of in accordance with the manufacturer's recommendations. Guidance on the disposal of sheep dips is contained in a booklet entitled "*Water; Preventing Pollution - by sheep dip*". This booklet and further advice on the subject is available free of charge from your local Agriculture Development Centre.

Sheep scab can be a commercial disaster to a sheep flock. On notification of suspicion of the disease, DANI will assist the flockowner in confirming the diagnosis and will ensure that the condition is treated rapidly and effectively. Where flocks are considered to be at risk, owners are notified and advised on protective measures. In this way, the severe animal welfare implications and production losses which are associated with sheep scab can be minimised.

## **KEY POINTS**

- The presence of sheep scab in your flock can be a commercial disaster.
- Sheep scab is a notifiable disease which DANI will assist in diagnosing and ensuring the flock is treated effectively to eradicate the condition.
- Prompt identification and treatment will minimise the severe animal welfare implications and production losses which are associated with sheep scab.
- Protective clothing and proper precautions must be taken when using sheep dips.
- All sheep dips should be disposed of in accordance with the manufacturer's instruction.

# FOOT-ROT

*Fraser Menzies BVM&S, MSc, MRCVS  
DANI, Veterinary Sciences Division*

Foot-rot is a common cause of lameness in sheep which can lead to a 10% reduction in wool yield and poor body condition. The indirect losses incurred on a flock with foot-rot are all too often underestimated. The lameness associated with foot-rot reduces the ability of a sheep to graze which leads to a failure to thrive. The resulting poor condition score is a major contributory factor to increased rates of barren ewes or lambs taking a long time to fatten.

## ***Signs and causes***

Moderate to severe lameness is the most obvious sign of foot-rot. On closer inspection, there is swelling and wetness between the claws of the affected foot along with inflammation of the skin-horn junction and under-running/separation of the horn from the claw. No abscess develops unless complications set in.

Foot-rot is caused by a bacterial infection [*Dichelobacter (Bacteroides) nodosus* along with *Fusobacterium necrophorum*] but other factors contribute to its occurrence. Outbreaks in flocks tend to occur after prolonged damp, warm weather. Additionally, flocks which are kept at a high stocking density tend to have a higher proportion of sheep affected by foot-rot.

The most important fact to remember is that infected sheep are the source of infection for other sheep. Also, infected sheep can spread the disease around the flock without necessarily showing any signs of lameness themselves.

## ***Treatment***

An essential first step is to remove any under-run horn. This eliminates any nooks or crannies in which the bacterial organisms can be concealed and hence enabling them to cause the lameness to recur. Paring of the separated horn should be followed by the local application of an antibiotic spray. In more severe cases, injectable antibiotics may have to be used.

## ***Control and prevention***

Regular, correct foot trimming is a good management practice but it is also an essential first step when attempting to eradicate foot-rot from the flock. While foot trimming, separate the sheep which show signs of foot-rot from the rest of the flock. The sheep with healthy feet should then be put through a foot-bath and moved directly to pasture which has not been grazed by sheep for at least one month. Sheep with foot-rot should be separated from unaffected sheep, treated and run through a foot-bath. Severely affected sheep should be culled. Ideally, affected sheep should have their feet immersed in the foot-bath for at least two minutes and held standing in a clean pen for one hour after the foot-bath.

Foot-baths are most effective when feet are clean and so it is a good idea to put the flock through a water foot-bath before the chemical foot-bath. A 10% zinc sulphate foot-bath is a commonly used, effective treatment. Using a 5% formalin foot-bath is an alternative, but this chemical should not be used for sheep where the sensitive tissues of the foot have been exposed during trimming. Sheep with foot-rot will need to receive foot-bath treatments every week for four weeks (remember to move them to clean pasture each time).

These control measures are all essential if you wish to seriously consider eradicating foot-rot from your flock. An eradication programme will stand a much greater chance of success if it is carried out during a dry summer. Before embarking on any foot-rot eradication programme, consult with your local veterinary surgeon, who can devise the best approach for your flock.

Foot-rot vaccines are available which may help to reduce the occurrence of the disease in your flock but need to be used along with the other control methods. Relying solely on vaccination will not eliminate the condition. Again, consult your local veterinary surgeon for further advice on this matter.

If your flock has no foot-rot problems, then *beware* of buying sheep which have foot-rot and could thus be a source of infection. Straying sheep may also carry the infection. Currently there is a particularly severe form of foot-rot spreading through sheep flocks in Great Britain, so be extra vigilant in the case of sheep originating from outside the province. It is good practice to keep any bought-in sheep separate from the main flock for at least three weeks. During that time, pare and examine the feet of these newcomers and treat any infection accordingly. Do not forget that rams and goats can carry this infection too!

One final point. Remember to collect, remove and destroy all the foot trimmings from the handling pens. The trimmings can harbour the foot-rot bacteria and thus be a potential source of re-infection to the flock when they are next congregated into the handling pens.

## **KEY POINTS**

- Foot-rot is caused by a bacterial infection and is introduced and spread around the flock by infected sheep.
- Regular foot trimming, the use of foot-baths along with rotational grazing are the key to controlling foot-rot.
- Separate sheep with foot-rot from the rest of the flock and treat accordingly.
- Cull severely affected animals.
- Introduction of new stock to the flock can introduce new diseases such as foot-rot.

# PROTECTING YOUR FLOCK AGAINST NEW DISEASES

*David Torrens BVM&S, MBA, MRCVS  
and David Brown BVM&S, MRCVS  
DANI Veterinary Service*

The introduction of the Single European Market in January 1993 provided more opportunity to obtain sheep with superior genetics from other European countries. However, there is also a greatly increased risk of importing new diseases, due to the increased reliance on individuals to perform voluntary checks on imported sheep.

If a new disease *does* enter a flock, there is a high risk it will have spread widely before being detected, and eradication from both the individual and national flock will be extremely difficult and costly. The only workable strategy therefore is to ensure disease does not enter the Northern Ireland sheep flock in the first place.

## THE DISEASES

Sheep entering Northern Ireland from other Member States must be certified as being free from certain diseases. It is thus vital to check the accompanying documentation to ensure that you are getting the cover you are entitled to. In addition to these certified diseases, there are other diseases which can lead to serious financial loss if they get into your flock. The main way such diseases gain entry is by movement of new sheep into your flock. Other means of disease entry are by using vehicles which are not cleaned and disinfected between batches of sheep, the sharing of equipment and machinery and the movement of people between farms.

Sheep diseases which do not occur in Northern Ireland	Sheep diseases which are uncommon in Northern Ireland	Sheep diseases which you want to keep out of your flock
<ul style="list-style-type: none"><li>• Maedi-Visna</li><li>• Contagious Agalactiae</li><li>• Foot and Mouth Disease</li><li>• Bluetongue</li><li>• Brucellosis</li><li>• Caseous Lymphadenitis</li></ul>	<ul style="list-style-type: none"><li>• Scrapie</li><li>• Johne's Disease</li><li>• Jaagsiekte</li></ul>	<ul style="list-style-type: none"><li>• Sheep Scab</li><li>• Salmonella abortions</li><li>• Enzootic Abortion of Ewes (EAE)</li><li>• Virulent Foot-rot</li><li>• Border Disease</li><li>• Resistant parasitic worms</li></ul>

## THE DIFFICULTIES

The benefits in maintaining a disease-proof unit (so-called '*Fortress Farming*') in any livestock enterprise are obvious. But what does this mean in practice?

- Movements onto a farm must be strictly controlled and kept to a minimum;
- Preventing contact across farm boundaries;

- Minimising the risk from using shared facilities such as handling pens, vehicles and dippers;
- Preventing the spread of disease by people or equipment such as at shearing time.

These preventive measures can be easily implemented in small, low-ground flocks. However, *Fortress Farming* will prove more difficult for a large number of commercial sheep flocks. Indeed, the stratified nature of the sheep industry, the use of common grazing and the wintering of sheep on other farms may make it impossible to totally apply these measures.

## BIOSECURITY IN PRACTICE

### *Purchase policy*

A closed flock is always the ideal situation. However, to be a truly closed flock there must be no purchase of any sheep including rams and lambs. Additionally, there should be no sheep brought home again from shows and markets. This is increasingly possible with new developments such as:

- reproduction - e.g. artificial insemination (AI);
- marketing - e.g. lamb-groups selling direct to slaughter, Electronic Auctions.

If it is necessary to purchase sheep, only do so from known disease-free local sources or reputable importers. If you are considering importing sheep, always seek the advice of your local Divisional Veterinary Office (DVO) on the disease status of the area of origin prior to importation. You should check imported consignments immediately on arrival to ensure that they are accompanied by the necessary documentation, in particular the health certification. Check that the identity of the sheep corresponds to the details listed in the certificate and that the animals appear to be healthy. If the documentation is incomplete or does not match with the imported consignment you must contact your local DVO immediately. It is vitally important to follow all conditions of the import certificate such as isolation of the imported sheep and testing for Maedi-Visna.

*Remember, the official certification provided by the exporting EC Member State only covers the major diseases of sheep.* If you wish to safeguard against other diseases such as enzootic abortion of ewes (EAE) and border disease you are strongly advised to seek additional private veterinary certification from the vendor or exporter. Furthermore, some diseases such as caseous lymphadenitis may not be evident to the certifying vet at the time of examination. Your veterinary surgeon will be able to advise you in this area. Another important source of guidance is the Industry Code of Practice on Importation of Animals agreed between NIVA and UFU. This should be consulted for all importations including those from Great Britain.

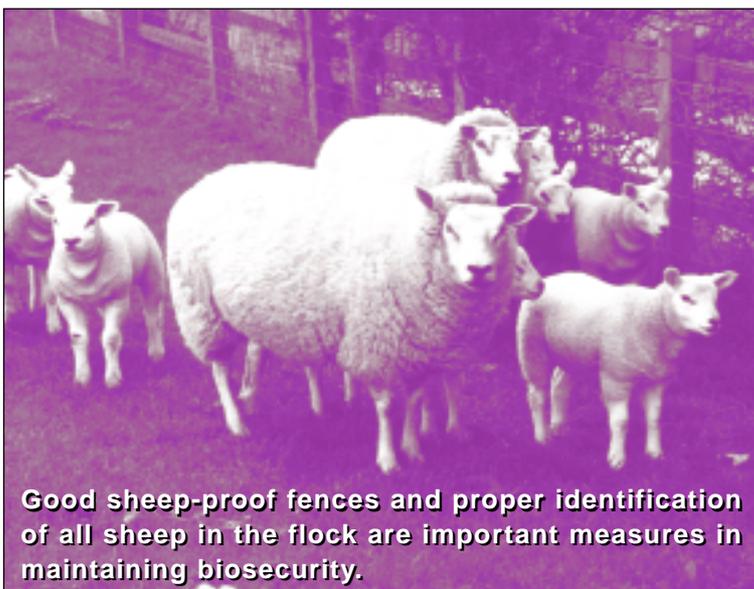
Control measures can never be 100% effective. Modern methods of transport are rapid and animals can be carrying disease but may not show any signs of illness until after they arrive on your farm. *All purchased sheep should be isolated for at least three weeks and watched closely.* Contact your local veterinary surgeon at the first signs of ill health.

During this isolation period, it is important to carry out some routine disease preventative measures. These measures would include giving fluke and worm treatments, foot-trimming, foot-bathing and administering any vaccinations which you normally give to your flock. It is also advisable to treat the newcomers for sheep scab either by injection or dipping. Your veterinary surgeon can recommend the best strategy for your flock.

During their first year in the flock, all purchased ewes should be separated from the main flock at lambing time in order to minimise the risk of introduction and spread of infectious forms of abortion such as EAE. Remember that you can carry infection to the main flock on your hands and clothing, so a routine disinfection procedure should be used when moving between these groups.

### ***Farm security***

It is necessary to maintain good sheep-proof fences to prevent direct contact between your sheep and those in another flock. It is good practice to identify all sheep in your flock with your flock holding number. This will allow immediate tracing of sheep if straying does occur.



Diseases can also spread between sheep indirectly via handling pens and dippers, so it is preferable if yours is the only flock using particular facilities. If you share pens or indeed equipment such as sheep shears, you must clean and disinfect them between batches. Vehicles used for transporting sheep should be thoroughly cleaned and disinfected both before and after use.

Vermin and wild birds can also act as carriers of disease and effective measures should be taken to exclude them from farm buildings and to prevent them from having access to feed supplies. Troughs used at grazing should be turned upside down when empty.

Visitors to your farm and their vehicles are also potential sources of new diseases for your flock. If it is necessary to bring in outside help such as at lambing time, provide disinfectant foot-dips and separate protective clothing. The converse is also true. Remember, to dip your own feet and change your own clothes after being in contact with other sheep.

Ideally, meal bins and loading ramps should be located near the entrance to the farm so that they are away from stock.

## ***General measures***

A preventive health programme should be developed for your flock under the guidance of your veterinary surgeon. Good hygiene with regular cleaning and disinfection of houses will help prevent the build-up of infection and reduce the risk of disease spreading within the flock. Always use an approved disinfectant. A list of approved disinfectants can be obtained by contacting your local DVO.

Goats should be permanently kept away from any areas where sheep may graze. Apart from risk from infectious diseases, goats are one of the main causes of the spread of resistance to wormers.

## ***Other Issues***

Scrapie is now being viewed with concern by consumers and importing countries. Northern Ireland is fortunate in having a very low incidence of scrapie which could be jeopardised by importation of apparently healthy animals already incubating the disease or by importation of sheep with low scrapie resistance.

Although fortress farming is more difficult to implement for a sheep flock, by using the practical advice outlined above, it is possible to significantly reduce the risk of introducing new diseases into your flock. The main point to remember is that the biggest threat to your flock is other sheep. Keep this in mind when you are buying replacements for your flock.

## **KEY POINTS**

- A healthy sheep's potential enemy is another sheep and a healthy flock's potential enemy is another flock!
- If it is essential to import sheep from another country, ensure the accompanying documentation is correct and keep the batch separate from your main flock for at least 3 weeks.
- Only purchase sheep from known, reputable sources.
- Keep purchased sheep in a separate flock for lambing for their first year.
- Develop a standard procedure for management of replacements along with your veterinary surgeon.

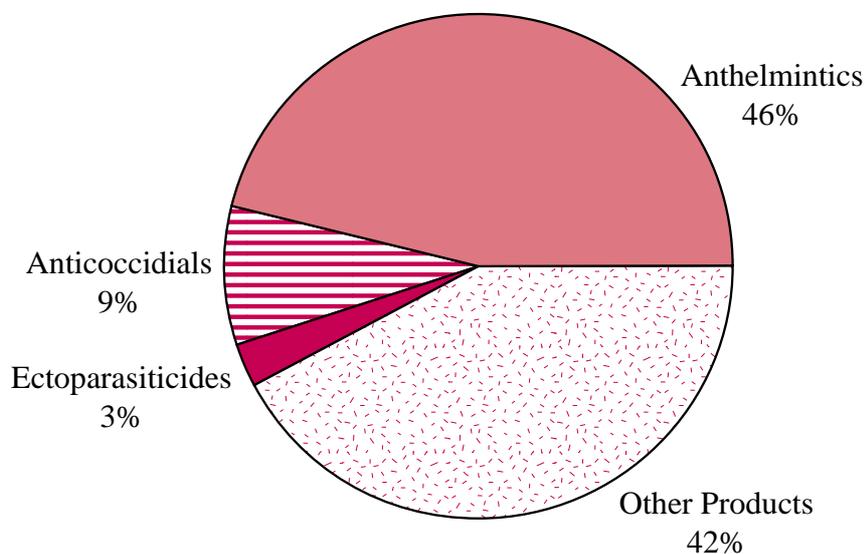
# REDUCING SHEEP LOSSES DUE TO WORMS AND FLUKE

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Parasitic diseases are the major causes of expenditure on animal health in Ireland, both north and south. The chart below demonstrates that anthelmintics account for approximately half (46%) of the animal health treatment costs in Ireland. Anthelmintics are used as the primary method of control for both worm and fluke infections.

## ANIMAL HEALTH TREATMENT COSTS IN IRELAND<sup>1</sup>

(£58 million in 1991)



Sheep are especially susceptible to the effects of parasites. Even a low to moderate worm infection will reduce feed intake by 20% and cause intestinal damage which results in poor absorption of nutrients. As a result there is poor bone growth in lambs, reduced wool growth in ewes, loss of weight gain and poor carcass composition. In addition, long-standing parasitic infections will produce immunological suppression which can result in secondary bacterial diseases such as pneumonia. In summer, there is also the added danger of fly strike if diarrhoea is present as an effect of worm infections.

Liver fluke is currently found in approximately 4% of lambs slaughtered in Northern Ireland, and in a much higher percentage of ewes. Severe infections can cause sudden death in the autumn, and chronic infections can result in anaemia in late winter and spring. The cost effectiveness of anthelmintic treatment should be maximised by the carefully planned use of the drug being given, as each chemical is not equally effective against all species and ages of worm and fluke. Neglect of these aspects of worm and fluke control has resulted in much wasted effort and money by farmers, and it is the intention of this short article to point out the most effective practices.

<sup>1</sup> Source - Animal Pharm, October 1991.

## CONTROL OF WORMS

In general, worm infections are of most importance in lambs during their first six months of life, and to a lesser extent in store lambs and in future breeding stock. Normally, ewes are not thought to be particularly badly affected by worm infections *but they are the major source of summer worm infections for their lambs*. As a result, consideration has to be given to worm control in adult stock in some situations. There are several species of worms which infect sheep, but in practice three species are of most concern in Northern Ireland. These are *Nematodirus*, *Ostertagia* and *Trichostrongylus* but, as the former has a different type of life cycle from the latter pair, control has to be considered separately.

### *Nematodirus species*

This worm only affects lambs between 6-12 weeks old, and is passed on from the lambs of one year to those of the following year by contamination of the grass with the eggs of the worm. The eggs of the major species involved (*N. battus*) only hatch after experience of the cold in winter. In Northern Ireland, hatching usually takes place in April and affected lambs are noticed later in that month or in early May. The principal symptom is watery diarrhoea, but care should be taken with diagnosis as coccidiosis, which has similar symptoms, is also common at that time of year in lambs of the same age. Accurate differentiation requires examination of at least ten samples of faeces from both affected and unaffected lambs. Submission of only one or two samples can give misleading results.

Control of *Nematodirus* can be achieved by two methods:

**Method 1:** Since the infection is only present on grazing used by the previous year's lambs at the same time of the year, avoidance of that pasture during the first four months of the lamb's life will prevent infection.

**Method 2:** Since most farmers are unable to avoid infected pasture, the remaining solution is to rely on anthelmintics. Lambs should be dosed once or twice, depending on the persistence of the anthelmintic. With short acting anthelmintics such as levamisole (very effective against *Nematodirus*) or benzimidazole 'white drenches', treatment needs to be given at approximately six and ten weeks of age. With persistent drugs such as moxidectin or doramectin one treatment may suffice, but it should be noted that their persistence of efficacy is not nearly as long for *N. battus* as it is for other worms, and a second treatment may be needed. It should also be remembered that lambs quickly develop immunity to *Nematodirus* species, but this is not the case with other worm species by which they are infected.

### *Ostertagia and Trichostrongylus species*

These worms affect lambs from June onwards. Infection derives from three sources:

- Infective larvae on sheep pasture which have survived from the previous summer;
- The periparturient rise in worm egg output from the ewes (this is the major source of infection as the eggs start to hatch in May);
- Autoinfection by larvae from the first two sources which hatch from mid-summer onwards.

In Northern Ireland, control is normally by the use of anthelmintics as the climate and farm size make it very difficult for “clean grazing” schemes to be carried out successfully for more than one year. There are two different approaches to the control of *Ostertagia* and *Trichostrongylus* infections which are discussed below.

**Method 1:** Do not treat the ewes to reduce the periparturient rise; thereafter *treat lambs approximately every 4-6 weeks* from the age of six weeks onwards, and simultaneously try to move lambs to after-grass, which has not had sheep on it that year. Movement to clean pasture should take place within 48 hours of the worm treatment being given. This method involves increased anthelmintic use (and labour) and therefore also tends to promote development of anthelmintic resistance. It is the most commonly used method in Northern Ireland and has become almost the traditional approach to control.

**Method 2:** *Treat the ewes after (or close to) lambing.* In order to derive maximum benefit, it is essential to use one of the modern endectocides, moxidectin or doramectin (ivermectin drench and injection has less persistence although there will soon be an ivermectin bolus available for ewes which will have a persistent effect of approximately 100 days). It is almost useless (and hence a waste of money and effort) to use levamisole or a benzimidazole for this treatment regime as they have little or no persistent effect. If moxidectin has been used, lambs may only need one preventive treatment for *Nematodirus* plus one other dose before reaching finishing weights. If this approach is utilised along with movement to grazing not used by sheep for a year, lambs may need very little or no treatment. This method therefore requires less labour and causes less exposure of worms to anthelmintics, but is probably as costly in drugs because of the need to treat ewes rather than small lambs.

## CONTROL OF LIVER FLUKE

In contrast to worms, liver fluke affects ewes and store lambs much more than younger animals. Without going into the complexities of the life cycle of liver fluke, control in Northern Ireland requires the use of anthelmintics, since avoidance of damp grazing areas is too difficult to ensure. The most effective anthelmintic is triclabendazole, which has a high efficacy against all ages of liver fluke. Closantel is effective against immature and adult fluke from about 5 weeks, and other drugs are only active against adult fluke from 12 weeks onwards. On farms with liver fluke problems, the minimum dosing required is two treatments in October and January, but another treatment in April has been shown to be very beneficial in reducing the infection in the autumn of the same year. When this regime is repeated annually, the occurrence of liver fluke will decrease. On slightly infected farms, one or two treatments are usually sufficient.

It should be noted that there is a promising vaccine against liver fluke being developed in Australia, but it is unlikely to be available in the near future.

## KEY POINTS

- Worm infections are of greatest importance in lambs during their first six months of life.
- Control of *Nematodirus* can be achieved either by grazing management or by the use of anthelmintics.
- Ewes are the major source of *Ostertagia* and *Trichostrongylus* infections for their lambs.
- Control of *Ostertagia* and *Trichostrongylus* infections can be achieved by treating the lambs every 4-6 weeks or by treating the ewes shortly after lambing.
- Liver fluke mainly affects ewes and store lambs. Control requires the use of anthelmintics which have a high efficacy against all ages of liver fluke.
- On farms with liver fluke problems, at least two treatments in October and January are required. However a third treatment in April would dramatically reduce the level of infection later that year.

# THE SHEEP CALENDAR YEAR - A PREVENTIVE MEDICINE PROGRAMME

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Association of Veterinary Surgeons Practising in Northern Ireland*

There have been many advances in the treatment and prevention of sheep disease in recent years. However inefficiencies in disease control can result from failure to plan effective prevention strategies or application of these at inappropriate times. This article gives a general overview of disease control measures which should be undertaken at different stages throughout the year. In planning disease prevention measures best suited to your own sheep farm, it is essential to seek the input and advice of your veterinary surgeon.

This article considers the actions which should be taken at strategic times of year, starting in the autumn time and divides the flock into the groups which require different management approaches during the year. A table at the end of this article summarises the action points at the key times in relation to tupping and lambing.

## AUTUMN

Remember that the calendar of events is ultimately controlled by the planned start of mating. Tups put into a flock in *August* will produce lambs in *January*. Those put in during *November* will produce lambs in *April*. For management purposes, the flock can broadly be divided into three sections. These are:

- Replacements;
- Resident ewes;
- Rams.

**Replacements** (bought in males and females)

### *Vaccination*

Vaccination against *Clostridia* and *Pasteurella* should be carried out shortly after arrival, especially if there is a history of pulpy kidney or black disease on the farm. Note that the first dose of vaccine is only a sensitiser or primer; full protection is only gained after application of the second dose which should be given 4 weeks later.

### *Control of liver fluke and worms*

In wet areas with a high level of liver fluke, dose in October using a product which will kill both adult and immature fluke. It is advisable to dose again in January and in April. Treat replacements for worms upon arrival, especially if the previous dosing history is unknown.

## ***Feeding***

It is good practice to graze replacements separately. This practice allows the replacements time to settle in and also allows time for any disease problems to become obvious. Ewes lambs should be provided with the best grazing available as they are still growing.

## ***Control of enzootic abortion of ewes (EAE) and Toxoplasma***

Vaccinate replacements at least four weeks before tupping if there is a history of EAE or toxoplasmosis in your flock. Remember that vaccination against EAE will not protect replacements if they have already been infected with the organism.

## ***Foot care***

Pare feet and foot-bath, using 5% formalin or 10% zinc sulphate. Again, this is best carried out shortly after arrival of the replacements so that any virulent foot-rot can be detected and managed accordingly.

## **RESIDENT EWES**

### ***Foot care and final cull***

The final cull of ewes should occur 6-8 weeks before tupping commences. It is ideal to carry out this cull selection along with a strategic flock foot paring and foot-bathing session. Select ewes for culling on the basis of udder, teeth and body condition. Additionally, remember to cull ewes with a history of vaginal prolapse (these ewes should have received a permanent marking when the prolapse occurred so that they could be easily identified for culling at a later stage).

## ***Feeding***

The aim is to have ewes in good body condition for tupping (condition score 3). This can be achieved by early weaning and by flushing the ewes on good pasture before tupping. For hill ewes, additional concentrate feeding before tupping may be required.

## **RAMS**

### ***Body condition***

A body condition score of 4.0 for lowland rams at tupping is ideal. Remember that rams will need a lot of reserves during the next 6-8 weeks and therefore feeding must be at a good level.

### ***Foot care***

Healthy feet are extremely important if the tup is to perform successfully. Pare feet and foot-bath well in advance (4-6 weeks) of tupping. Foot-rot vaccination should be considered for rams and requires two primary doses followed by a booster vaccination every 6 months. Start vaccination in the autumn and give a booster in February.

### ***Fertility Examination***

The reproductive organs of all rams should be examined by your veterinary surgeon before tugging. Such an examination should include semen sampling to check that the rams are fertile.

### ***Vaccination***

For ram lambs, it is recommended that a combined Clostridia/Pasteurella vaccine is given in the autumn and repeated four weeks later. A booster vaccination should be given annually to older rams.

### ***Sheep scab***

Bought-in replacements, resident ewes and rams should all be dipped using an approved scab dip (following the appropriate safety codes) or, should be injected with a suitable modern endectocide to control sheep scab. These treatments should be given in late autumn. You should contact your local Divisional Veterinary Office for further advice.

## **WINTER**

When tugging starts, ewe feeding should be held at a level to maintain condition for 6-8 weeks. The condition of the fit ewes may then fall slowly for the next two months. Ultrasound scanning of the ewes is advisable to predict multiple births. This is best carried out at 80-105 days after introduction of the tups. Concentrate feeding should start 6 weeks prior to the start of lambing and, where multiple births are expected, feeding should be gradually increased. Two other articles in this booklet provide more detail on the feeding requirements of the ewe during pregnancy and lactation.

### ***Copper deficiency (some farms only)***

It is recommended that at least six ewes are blood sampled 2-3 months before lambing so that blood copper levels can be checked. Selenium, vitamin E and cobalt levels may also be monitored at the same time.

### ***Abortions***

Aborted lambs and afterbirths should be submitted to a veterinary laboratory so that an early diagnosis of any infectious cause can be identified. This will enable early appropriate preventive action to be taken.

### ***Pre-lambing vaccination***

It is recommended to use a combined Clostridia/Pasteurella vaccine booster 4 weeks before lambing starts. Avoid vaccinating wet sheep.

### ***Control of liver fluke (some farms only)***

Use a product which will remove adult and immature flukes. Dose in October and January. Use forecast data to help predict the risk of fluke and avoid grazing wet pastures as far as possible during September to March.

### ***Hypomagnesaemia (Grass Tetany)***

The major risk period for hypomagnesaemia is the first 4-6 weeks after lambing. To control this condition it is necessary to provide a daily supply of magnesium in the feed ( $\frac{1}{2}$  oz calcined magnesite per head per day). Start magnesium supplementation shortly after lambing and continue throughout the risk period.

### ***Twin lamb disease (pregnancy toxaemia)***

It is worthwhile getting your veterinary surgeon to blood sample a number of ewes in late pregnancy to check that feeding levels are adequate. If necessary, feeding levels can then be adjusted, to help prevent cases of twin lamb disease occurring.

## **SPRING**

Lambing time is the most important period for the sheep farmer and being properly prepared is essential. For example, this would include being equipped to help a lambing ewe or to give a hypothermic lamb the correct treatment. The following checklist of some useful things which should be kept in the *Farmers first aid cupboard* will enable you to tackle the most common occurrences at lambing time.

<b>Farmers First Aid Cupboard Checklist</b>
Lubricant
Arm-length plastic gloves
Lamb stomach tube and syringe
Frozen colostrum
Tincture of iodine (e.g. for treating navels)
Thermometer (e.g. to test a lamb for hypothermia)
Antibiotic injection
Antibiotic drench for lambs
Glucose 20% injection
Calcium/magnesium injection (e.g. 400 ml 20% calcium)
Oral glucose (e.g. liquid lectade)
Syringes (e.g. 50 ml, 10 ml and 5 ml)
Selection of injection needles

### ***Lambing***

Lambing is a high risk occupation! Seventy five per cent of ewe deaths and 70% of lamb deaths occur at or near lambing. The biggest problem for any shepherd is when to assist the lambing ewe. The second problem is to decide when veterinary assistance is required.

The following are some useful hints when you have to assist at lambing:

- (a) Use plenty of lubrication;
- (b) Use small hands covered with disposable plastic gloves;
- (c) Ewes cannot withstand prolonged vaginal and uterine interference. If you cannot lamb the ewe within 5-10 minutes, seek veterinary help;
- (d) Keep procedures as clean as possible but inject with long-acting antibiotic afterwards, in consultation with your veterinary surgeon;
- (e) The use of braided cords or fine rope is useful to snare head and legs. Snaring over the head is useful to permit traction;
- (f) Do not pull too hard! Tight lambings can cause trauma to the lamb leading to rapid death;
- (g) Always, always examine for another lamb (even after number four has safely arrived!);
- (h) Check the udder of the ewe after delivery. Ensure as far as possible that the lambs receive colostrum either naturally from the dam or via a colostrum bank. If in doubt, give 100 mls of colostrum by stomach tube;
- (i) Pay good attention to the lamb - suspend, blow in the nostrils, dry the lamb, then return to the dam for licking;
- (j) Treat the lambs' navels with tincture of iodine or antibiotic spray.



### ***Reducing lamb mortality***

This can be reduced by the following:

- (a) Separate ewes into lambing groups which makes management easier (e.g. by raddle marking, by single or multiple births, ewe lambs in separate group);
- (b) Ensure ewes have milk;
- (c) Pen weakly lambs and bad mothers for longer than normal;
- (d) Watch for empty tucked up or dull lambs during first few days. Feed and warm as necessary;
- (e) Have plenty of lambing pens and pay attention to cleanliness;
- (f) Put newly lambed ewes in fields with plenty of shelter;
- (g) Dress lambs' navels with tincture of iodine or antibiotic spray;
- (h) Collect colostrum and use a stomach tube to administer colostrum to weak lambs;
- (i) Mark sheep and her lambs on both sides with the same number. This allows identification from a distance;
- (j) Use one colour for singles, and a different colour for doubles. Keep one day's lambs and ewes in a small paddock until the lambs are 3 days old.

### ***E. coli scours and “Watery mouth”***

These diseases are covered in the article “Prevention of neonatal mortality in lambs” which is contained in this booklet.

### ***Castration***

Remember that rubber rings can only legally be applied to lambs before they are 7 days old. Also, an anaesthetic is required by law to castrate or tail dock a lamb which is over 3 months of age. The burdizzo clamp is a useful method of castration.

### ***Worm control***

The following points need to be considered when targeting the control of worm infections in lambs. More details on parasite control can be found in another article in this booklet entitled “Reducing sheep losses due to worms and fluke”.

- Ewes moving to clean pasture should be wormed after lambing - this reduces their worm egg production;
- Try to avoid using the same pasture for lambs before weaning for two consecutive years;
- Ewes moving to ‘dirty’ pastures should be early lambing ewes with single lambs, as these will be the first to be weaned and hopefully will miss the July peak of infected larvae.
- Worm lambs at weaning and find clean aftermath grazing;
- The time intervals between worm doses for ewes and lambs depends on the wormer which is being used. Your veterinary surgeon can advise you on this matter.

## **SUMMER**

### ***Scald in lambs***

Scald reduces weight gains. It is best controlled by the use of a foot-bath and no trimming should be necessary. Any individually affected lambs can be treated by topical application of an antibiotic spray.

### ***Pulpy kidney/pasteurellosis***

If you expect to change the animal’s diet or plan to keep as stores, vaccinate lighter lambs at 12 weeks and again at 16-18 weeks of age. Those to be slaughtered by 18 weeks do not require vaccination against clostridial diseases such as pulpy kidney, neither do those who finish at grass on the premises of origin, unless the farm has a history of clostridial disease.

### ***Control of coccidiosis***

This is covered in the article “Prevention of neonatal mortality in lambs” in this booklet.

### ***Worm control***

This is covered in the previous section and also in the article on “Reducing sheep losses due to worms and fluke” in this booklet. It may be worth checking the efficacy of worm control strategies by laboratory examination of faeces samples from ten growing lambs, especially if any lambs are scouring or losing condition.

### ***Mineral deficiencies***

Blood samples from growing lambs should be monitored for any evidence of copper, selenium or cobalt deficiency.

### ***Fly strike***

Fly strike can be prevented either by dipping, by application of pour-on solutions or by certain spray-on products. If you use dipping to prevent blow fly strike, remember to:

- Dip at least 3 weeks after shearing;
- Use the dip at the correct dilution (a knowledge of the dipping bath is therefore important);
- Do this job thoroughly adhering to the relevant safety codes.

### ***Consult the professional !***

Your veterinary surgeon can design a preventive medicine programme for your farm which will control the major sheep diseases in your flock. This programme will include visits at strategic times of the year and will help to keep your sheep enterprise as profitable as possible.

## **TIME TABLE OF KEY POINTS**

<b>Target Time</b>	<b>Actions Checklist</b>	<b>Nutrition</b>
One month before tupping	Condition score ewes (3.0) and tups (4.0) Fertility test the tups Examine feet of whole flock: - trim and foot bath - cull ewes with severe or chronic foot problems, poor teeth, poor condition Give abortion vaccinations (e.g. EAE, Toxoplasma) Worm ewes that are in poor condition Give fluke doses: October and January	Start flushing
Tupping and one month afterwards	Minimal interference with the flock to minimise loss of embryos (e.g. no handling, no dogs)	No changes in diet

## TIME TABLE OF KEY POINTS

Target Time	Actions Checklist	Nutrition
Three months before lambing	Blood sample ten ewes Give orf vaccination, if required	Check copper, cobalt, vitamin E and selenium levels
Two months before lambing	<b>Gimmers</b> First vaccination (Clostridia/Pasteurella/ <i>E. coli</i> ) Blood sample to check for evidence of pregnancy toxemia <b>Watch for:-</b> Twin lamb disease Calcium deficiency	Start concentrate feeding and increase gradually
At lambing	<b>Ewes</b> Worming dose Cleanliness when lambing <b>Watch for:-</b> Calcium deficiency Mastitis Metritis (lamb bed infection)	<b>Lambs</b> Treat navel Adequate colostrum <b>Watch for:-</b> Hypothermia/starvation <i>E. coli</i> scour Watery mouth Joint ill
After lambing	<b>Ewes</b> Worm 3 and 6 weeks after turnout (unless a modern endectocide has been used) <b>Watch for:-</b> Hypomagnesaemia (Tetany) <b>Lambs</b> Coccidiosis (may use medicated creep feed as a preventive measure) Worm every 4-6 weeks from 6 weeks of age if clean pasture is not available	<b>Ewes</b> Magnesium supplement Stop concentrate feeding when grass is over 4cm in height
Three months after lambing	<b>Lambs</b> First vaccination (Clostridia/Pasteurella)	
Four months after lambing	<b>Lambs</b> Second vaccination (Clostridia/Pasteurella)	
Five months after lambing	<b>Lambs</b> Worm and wean to clean pasture	

**Past and present members of the  
“Healthy Sheep, Healthy Profits” Roadshow  
Working Group**

David Brown	DANI Veterinary Service
David Bryson	DANI Veterinary Sciences Division
Jim Carmichael	Northern Ireland Agricultural Producers Association
Sandra Dunbar	North of Ireland Veterinary Association
David Harding	Association of Veterinary Surgeons Practising in Northern Ireland
Keith Laughlin	Association of Veterinary Surgeons Practising in Northern Ireland
Trevor Lochart	Ulster Farmers Union
Fraser Menzies	DANI Veterinary Sciences Division
Charles Orr	Association of Veterinary Surgeons Practising in Northern Ireland
Sam Thompson	DANI Farm Development Division