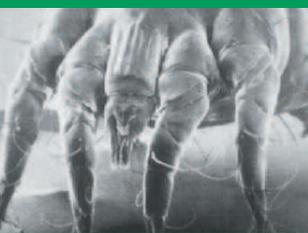


# Controlling external parasites for Better Returns



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EBLEX Better Returns Programme is grateful to all those who have commented and contributed to this production.

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Many external parasites that infest UK sheep flocks can hardly be seen with the naked eye, yet their effects on animal health, welfare and, of course, profit – can be significant.

This booklet aims to help you understand and identify the particular pests found amongst your flock. It provides information on how infections can spread and how to implement effective control strategies.

Through effectively prevention and control of external parasites, sheep farmers can improve the health of their flocks and deliver significant welfare benefits.

What is clear is that by fighting off the menace of external parasites, sheep farmers can improve the health of their flocks and deliver significant welfare benefits.



Katie Brian

EBLEX Project Coordinator

# Counting the cost

External parasites are robbing the sheep industry of returns.

For example

**£8.3\*** million lost to sheep scab

**£2.2** million lost to blowfly



## Permanent parasites

Eg scab mites, complete their whole life cycle on the sheep.

Spread has to be by contact with infected sheep.

## Semi-permanent parasites

Eg blowflies that cause strike, are typical of semi-permanent external parasites.

Part of the life cycle is completed away from the sheep. Therefore, you need to know the alternative hosts and either tackle them, or keep sheep away from the risk eg dung heaps.

A joined up approach bringing together an understanding of the parasite lifecycle, routes of infection and effective control has become increasingly important as pressure on the use of chemicals increases. Effective management is an important part of maintaining the limited weapons in the armoury available to sheep farmers.

\*Reference: Nieuwhof G.J., Bishop S.C., Costs of the major endemic diseases of sheep in Great Britain and the potential benefits of reduction in disease impact. Anim. Sci. 81 (2005) 23-29.

**Prevention is always better than cure**

# Keep your guard up

External parasites pose a threat to sheep flocks the whole year round and vigilance is the key to fighting off the menace. Good practice involves three key steps:



## Biosecurity

Ectoparasites can often be brought in on stock. To ensure trouble is not imported onto the farm, treat sheep on arrival for sheep scab and internal parasites and keep new sheep separate from the main flock for at least 21 days. Inspect them regularly for physical symptoms and loss of condition. If you suspect an ectoparasite consult your vet as soon as possible.

Maintain field boundaries and gates to protect stock.



## Inspection

Regularly inspecting a flock will often alert you to the early signs of a parasite attack. Any animal seen rubbing, scratching or chewing its fleece needs to be caught and inspected.



## Handling

Parasites often cause the fleece to loosen or body condition to be lost, so regular handling will again provide early warning of potential infestations.

## External parasites – a year round threat

	J	F	M	A	M	J	J	A	S	O	N	D
Sheep Scab	H	H	H	M	M	M	M	M	M	H	H	H
Blowfly	L	L	L	M	H	H	H	H	H	M	M	L
Lice	H	H	H	M	M	M	M	M	M	M	M	M
Ticks	L	M	M	M	M	H	H	H	M	M	L	L
Keds	H	H	H	M	M	M	M	M	M	H	H	H
Headfly	L	L	L	L	M	H	H	H	H	M	L	L

Risk: ■ High ■ Middle ■ Low

## Sheep scab (Permanent ectoparasite)



**Sheep scab is a progressive, debilitating mange caused by secretions from scab mites living at the edge of expanding, pus-covered skin lesions.**

Once a notifiable disease, control is now covered by the Sheep Scab Order (1997). Cases of scab have increased since the end of compulsory treatment.

Susceptibility varies between individual animals and some breeds are more prone to infestation.

### Lifecycle

In ideal conditions, the egg-larvae-nymph-adult lifecycle takes 14 days. Once fertilised an adult female does not mate again but lives for around 40 days, laying one to two eggs daily. The adult female mite is just visible to the naked eye - pearly white and globular - about 1mm long.

Infesting mites feed within hours of sheep contact. After feeding for a minute a tiny fluid-filled area appears on the skin surrounded by an inflamed zone.

These expand into larger pustules which eventually rupture and discharge liquid.

The time from initial contact to displaying visible lesions can be from 60 to 240 days.

### Timing

Sheep scab is mainly a winter problem, although summer cases are known.

### Signs

Sheep are the only hosts, mite infestation is widespread and can be fatal if left untreated.

Early symptoms are mild. Animals may rub against fence posts, toss their heads or be restless. Later, clean areas of fleece appear as sheep lick the lesion. Dirty areas may indicate where animals have scratched with hind feet. Badly affected animals may have a general air of depression.

Mites usually colonise withers, flank and brisket. Slower growth is recorded on the face, head, tailhead and belly.

Mites are usually found around the edges of the lesion as it spreads around the sheep.

Diagnosis is important as lice can cause similar symptoms, requiring different treatment.



*Sometimes, mites migrate to the centre of the lesion forming a 'flaky' scab. Large numbers of mites will be found on, or under, flakes.*

Wool over infested areas can become loose and sheds easily. Sores can open and bleed from rubbing or scratching. Sheep rapidly lose condition.



## Control

Once identified, scab mites must be eradicated with an appropriate chemical treatment.

Mites have developed full resistance to plunge dips containing synthetic pyrethroids. However there are no reports of resistance to organophosphorus products or Macrocytic Lactone (MLs). If resistance has been reported an alternative product must be used.

Scab mites can live off the host animal for up to 17 days and still infest sheep. Therefore, ensure all buildings, fences, gates and vehicles are disinfected.

Once clear of mites, operate good bio-security to avoid re-infestation. Source all new stock from reputable sources, and quarantine all incoming stock for at least 21 days.

Good fencing - ideally two parallel lines of fence one metre apart, will prevent contamination from untreated flocks on neighbouring farms.

**DON'T**  
**BUY IN**  
**SCAB!**

## Blowfly ('strike') (Semi-permanent ectoparasite)



**Blowfly strike is caused by larvae, or maggots, of greenbottle, bluebottle or black blowflies infecting animal tissues. Left unchecked, sheep die an agonizing death – thus strike poses a serious welfare challenge.**

Infestation develops where the eggs are laid.

**Breech** or **tail strike** arises from eggs laid around the back end - the most common form. In **body strike**, flies target the front of the animal. **Foot strike** and **head strike** are also possible.

### Lifecycle

Pregnant female flies travel several kilometres in search of a host and can lay up to 3,000 eggs in ten batches over three weeks.

Attracted by the smell of sweat or fleece contaminated with decaying organic matter, urine or faeces - the first wave leaves eggs on damaged or soiled areas. The eggs hatch within 10-12 hours and over three days larvae enter the skin using enzymes to digest the flesh.

More flies are attracted by the primary lesion and secondary bacterial infection.

Larvae leave the sheep to pupate in soil, where they can remain for 2-4 weeks in the summer. They overwinter as pupae remaining inactive until the soil temperature rises above 7°C.

### Timing

Body strike occurs in warm, humid weather conditions - from April to December in the South, and June to November in the North.

Breech strike is less weather dependent with urine and dags (faeces) attracting flies.

### Signs

The initial lesion is a foul smelling area of moist brown wool with maggots visible.

Sheep are distressed and depressed. In breech strike, animals stamp their hind legs and shake their tails vigorously.

### Control

Risk can be reduced by good husbandry. Examine flocks twice a day during the fly season.

Shearing reduces susceptibility to breech and body strike. Crutching, or dagging, from early April helps reduce risk.

Tail docking, (not less than 4") reduces breech strike. Controlling intestinal parasites, and reducing digestive upsets from changes in diet also helps.

Cull rams and ewes that are affected several times in a season.

Dispose of carcasses quickly and treat footrot immediately. Both will attract blowflies.

Treat any animal suspected of being struck immediately with a suitable plunge dip, spot-on or pour-on treatment. Be sure to observe withdrawal periods.

## Lice (Permanent ectoparasite)



**Lice infestations are occurring more widely across the UK following the de-regulation of scab control. Confusion with scab often leads to lice persisting. They particularly affect long-fleeced sheep and those in poor health.**

### Lifecycle

Lice infestations mostly occur in winter and spread slowly through sheep flocks. Prevalence is weather dependent.

Eggs hatch after one to two weeks, and lice then go through a series of nymphal stages for one to three weeks. Lice feed on wool and skin debris but can survive off the host for up to 17 days. Adults live up to a month.

### Timing

Mainly winter, although infested sheep have been recorded in the summer.

### Signs

Lice are small, pale to red/brown, with broad head and chewing mouthparts.

Lice are found amongst wool. Sheep nibbling their fleece, or rubbing, are typical signs of the irritation of lice infestation. Sheep can carry significant numbers without obvious clinical signs.

The clinical signs, eg itching and wool loss, can be confused with sheep scab but lice can also occur alongside scab infestation.

### Control

Good bio-security measures should aim to

prevent contact with infested sheep, eg closed flocks, thoroughly cleaning transport vehicles, quarantine of all incoming stock and good fencing between neighbouring units.



Populations decrease naturally with the onset of summer. Shearing can reduce residual populations by up to two thirds.

If one animal is found to be infested, treat the whole flock with an ectoparasiticide, ideally just after shearing.

Treatments include spot-ons containing deltamethrin, or cypermethrin and alphacypermethrin pour-ons. Lice can also be controlled by plunge dipping with diazinon.

## Ticks (Semi-permanent ectoparasite)



**Ticks can carry several important diseases which affect sheep, other livestock and humans.**

Ticks can carry:

- ♦ tick-borne fever
- ♦ lamb pyaemia ('cripples')
- ♦ louping ill
- ♦ lyme disease.

Tick populations are increasing. In some upland areas flock owners report 20% lamb losses from tick-borne diseases.

### Lifecycle

Ticks pass through four stages egg, larvae, nymph and adult. All stages are parasitic, but they do spend long periods off the host living at the base of dense vegetation. Changes in farming practices such as reduced bracken control has increased tick numbers in upland areas considerably.

Eggs are laid in batches of several thousand and all active stages feed on blood. Each stage feeds only once.

Adult ticks only feed on larger mammals, such as sheep. Larvae and nymphs can also feed on young lambs, other small mammals and birds.

Ticks actively seek a host using a sensory organ on the front legs that detects minute concentrations of carbon dioxide and heat from animals walking by. The tick attaches itself to the host by waving its legs in the air.

After feeding the tick drops off the host in to vegetation to digest the blood meal and moult to the next stage.

### Timing

There are generally two waves of tick activity. Adult ticks and nymphs feed between February and October with nymph numbers rising markedly in humid conditions from July onwards.

### Signs

Ticks attach to face, ears, inside top of leg and groin. Some species cause intense irritation and symptoms can be confused with scab or lice.

### Control

Sheep must be protected against ticks. Effective plunge dipping, spot-on and pour-on chemical treatments are available.

## Keds (Permanent ectoparasite)



**Keds are wingless, blood-feeding flies. Adults are red/brown, 4–6mm long, with a broad head and stout piercing mouthparts.**

Keds spend their entire life on sheep and in large numbers cause varying degrees of anaemia. Excreta can stain wool leading to downgraded fleeces.

### Lifecycle

Keds can complete their life cycle in just five weeks. Females live for four to five months, during this time up to 15 larvae will be produced. The female retains larvae within her body for seven or eight days until fully-grown, then deposits it as an immobile pre-pupa that pupates once attached to the wool.

Pupae develop over a narrow temperature range of 25°–34°C, with optimal development at 30°C. Puparia are glued to the fleece and carried away from the skin as the fleece grows. The temperature near the skin will be 37°C - cooler towards the fleece tip. Puparia are deposited where a suitable temperature will be found during the three weeks of pupal development.

Pupa can be found in the neck, forelegs and flanks of adult sheep. In lambs, they tend to concentrate on hind legs, neck and belly.

### Timing

Winter.

### Signs

Sheep infested with large numbers will be restless and bite, kick and rub affected areas. Keds can be distinguished from ticks as they have six legs (ticks have eight).

### Control

Dipping largely eliminated keds so infections are rare. Sheep identified with keds should be isolated, inspected and treated. Deltamethrin pour is licenced to control keds.

## Head fly (Semi-permanent ectoparasite)



**Similar in size to House Fly, with an olive-green abdomen and orange-yellow wing bases.**

While head fly occurs throughout Britain, damage from this pest has only been recorded in northern England and Scottish Borders.

Horned sheep with hairy faces, eg Blackface and Swaledale, are most susceptible.

### Lifecycle

The fly produces one generation a year. Eggs are laid in late July and September in soil under dense vegetation, usually on the edge of coniferous woodland.

Eggs hatch within seven days. Then carnivorous larvae feed and grow until late autumn. Development stops in winter. Pupation occurs in May, with adults emerging four weeks later.

### Timing

Head flies are only active during summer days. They will not fly in windy conditions.

### Signs

Head flies feed at the base of horns and on secretions from eyes and nose. Lesions at the skin/horn junction of young sheep and wounds, resulting from fighting in rams, also attract head flies.

Fly swarms cause head shaking, rubbing against the ground, or scratching with their hind feet. This may lead to broken, bleeding skin which attracts more flies.

With continual feeding around lesions large areas of skin from the head can be lost. Affected sheep are susceptible to blowfly strike.

### Control

Prevention using cypermethrin pour ons may need repeating every three weeks in high risk periods. Treat severely affected sheep with antibiotics and insecticidal cream. Wounds usually heal once fly activity ceases.

# Prevention and treatment

**Ectoparasites adversely affect animal welfare and, left untreated, may be fatal. Flock-owners have a legal responsibility to prevent or cure infestations. Failure to do so can lead to prosecution for animal cruelty.**

**However, controlling ectoparasites can be difficult, especially as fewer and fewer treatments are available. For instance, 2006 saw synthetic pyrethroid sheep dips withdrawn.**

Ectoparasites affect productivity by:

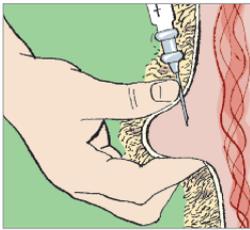
- ♦ reducing ewes' reproductive potential
- ♦ reducing meat and milk output
- ♦ increasing veterinary costs
- ♦ downgrading the wool clip.

## Which product?

A range of treatment options are available:

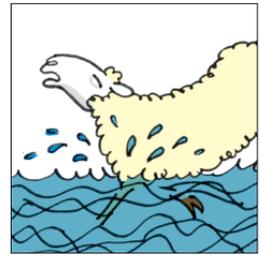
### Injections

- ♦ quick and easy
- ♦ match dose to heaviest sheep in batch
- ♦ no risk of product loss
- ♦ requires sheep to be penned
- ♦ injection must be accurate.



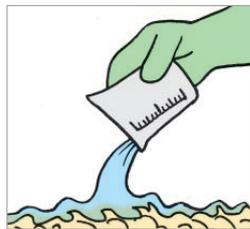
### Plunge dipping

- ♦ ensure good coverage
- ♦ dip early in the day to allow sheep time to dry
- ♦ avoid hot or cold weather and heavy rain
- ♦ stressful, especially for pregnant ewes
- ♦ avoid using within three months of shearing or slaughter
- ♦ drainage and disposal can be difficult
- ♦ farmers require a certificate of competence.



### Pour-ons

- ♦ simple to use
- ♦ timing is critical
- ♦ may require more than one treatment
- ♦ avoid using within three months of shearing or slaughter
- ♦ use the correct gun with recommended nozzle.



### Shower dipping

- ♦ cannot use plunge dip solutions
- ♦ ensure 'dipping' time allows product to reach skin
- ♦ not approved for scab control
- ♦ less effective fly control compared to plunge dipping.





**Shower dips have been used for many years in Australia and New Zealand to control blowfly and lice. However information on sheep scab control is limited.**

## Labour and equipment

Some treatments require extra labour, fixed equipment and waste disposal. Calculate the requirements for your system and workforce before deciding on a treatment method.

## After treatment

Avoid handling sheep post treatment. Foot trim before treatment, or leave as long as practically possible after treatment.

## Caring for the environment

Facilities should be available for the safe disposal of unused concentrate and unused dip wash. Dipping set-ups should be inspected regularly for cracks and leaks and should never be sited next to a water course. Kept treated sheep away from water courses for 14 days.

**Table showing the efficacy of currently available Ectoparasiticides in the UK**

Active Ingredient	Administration	Chemical	Meat Withdrawal Group	Scab (Days)	Lice	Ticks	Strike
Diazinon 60%	Plunge Dip	OP	70	C/P	C/P	C/P	C/P
Diazinon 62%	Plunge Dip	OP	70	C/P	C/P	C/P	C/P
Dicyclanil 5%	Pour-on	IGR	40	-	-	-	P
Dicyclanil 1.25%	Pour-on	IGR	7	-	-	-	P
Cypermethrin 1.25%	Pour-on	SP	8	-	C/P	C/P	C/P
Alphacypermethrin 12.5%	Pour-on	SP	49	-	C/P	C/P	C/P
Deltamethrin 1%	Spot-On	SP	35	-	C	C	C
Cyromazine 6%	Pour-on	IGR	28	-	-	-	P
Moxidectin 1%	Injection	ML	70	C/P	-	-	-
Moxidectin 2%	Injection	ML	104	C/P	-	-	-
Doramectin 1%	Injection	ML	63	C	-	-	-
Ivermectin 1%	Injection	ML	37	C	-	-	-

[www.noahcompendium.co.uk](http://www.noahcompendium.co.uk)

20th April 2012

OP = organophosphate, IGR = Insect Growth Regulator, SP = Synthetic Pyrethroid, ML = Macrocyclic Lactone, C = Curative, P = Protective

**Always use treatments strictly according to manufacturers' instructions.**



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# Non-parasitic skin diseases

Sheep can be affected by several non-parasitic skin diseases:

## Non-parasitic skin diseases of sheep

<b>Hereditary/ congenital</b>	Red foot		
<b>Prion</b>	Scrapie		
<b>Viral</b>	Border disease Orf (contagious pustular dermatitis) Foot and mouth disease		
<b>Bacterial</b>	Actinobacillosis Clostridial infection of wounds Staphylococcal folliculitis Staphylococcal dermatitis Scald		
<b>Fungal</b>	Ringworm Mycotic dermatitis		
<b>Allergic reactions</b>	Fly bite dermatitis		
<b>Non parasitic organisms</b>	Forage mites Soil nematodes		
<b>Miscellaneous</b>	Photosensitisation Fleece rot Wool slip Skin tumours Sunburn		

**Beware:** orf, staphylococcal dermatitis, mycotic dermatitis, fly bite dermatitis and forage mite infestations can easily be confused with sheep scab.

**Correct diagnosis is essential - always consult your vet for a definitive diagnosis**

# Best practice across the farm

Do not import parasites.

Check health status of your suppliers and quarantine all stock for at least 21 days.

Disinfect vehicles after use.

Personal hygiene is important to prevent pests spreading to other stock or people.

Building structures can harbour pests and disease. Disinfect after each batch of stock.

Beware of scab and lice in winter months.

Have treatment facilities.

Keep dips away from drains and watercourses.

Treat footrot to avoid fly strike.

Woods and hedges harbour flies. Check any nearby stock regularly.

Remove soiled wool.

Monitor flock regularly, watching for loose wool, rubbing, scratching and chewing.

Examine twice a day in 'strike' season.

Separation from neighbouring flocks to avoid spreading.

Ticks are a threat in dense vegetation.

Scab and lice can survive up to 17 days on fences, gates, etc.

Avoid contamination of water after treatment.



# Other BRP publications available

## Beef BRP

- Manual 1 – Choosing Bulls to Breed for Better Returns
- Manual 2 – Marketing Prime Beef Cattle for Better Returns (Updated 2012)
- Manual 3 – Improving Cattle Handling for Better Returns
- Manual 4 – Beef Production from the Dairy Herd
- Manual 5 – Feeding Suckler Cows and Calves for Better Returns
- Manual 6 – Improve Beef Housing for Better Returns
- Manual 7 – Feeding Growing and Finishing Cattle for Better Returns
- Manual 8 – Optimising Suckler Herd Fertility for Better Returns
- Manual 9 – Controlling Worms and Liver Fluke in Cattle for Better Returns

## Sheep BRP

- Manual 1 – Marketing Prime Lamb for Better Returns (Updated 2012)
- Manual 2 – Target Ram Selection for Better Returns
- Manual 3 – Target Lamb Management for Better Returns
- Manual 4 – Target Ewe Management for Better Returns
- Manual 5 – Target Store Lambs for Better Returns
- Manual 6 – Target Easier Management for Better Returns
- Manual 7 – Target Lameness for Better Returns
- Manual 8 – Target Worm Control for Better Returns
- Manual 9 – Improving Ewe Breeding for Better Returns
- Manual 10 – Controlling External Parasites for Better Returns
- Manual 11 – Target Ewe Fertility for Better Returns
- Manual 12 – Improving Ewe Nutrition for Better Returns
- Manual 13 – Improving Sheep Handling for Better Returns

## Joint Beef and Sheep BRP

- Manual 1 – Improving Pasture for Better Returns
- Manual 2 – Improved Costings for Better Returns
- Manual 3 – Improving Soils for Better Returns
- Manual 4 – Managing Clover for Better Returns
- Manual 5 – Making Grass Silage for Better Returns
- Manual 6 – Using Brassicas for Better Returns

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