

Controlling external parasites for Better Returns



The information in this booklet was compiled by Chris Lloyd and Katie Brian, AHDB Beef & Lamb, from original material supplied by Dr Peter Bates.

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Illustrations: Tebbit Design

Photography: Dr Peter Bates

For more information contact:

**Better Returns Programme
AHDB Beef & Lamb
Stoneleigh Park
Kenilworth
Warwickshire
CV8 2TL**

**Tel: 024 7647 8834
Email: brp@ahdb.org.uk
beefandlamb.ahdb.org.uk**

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Any enquiries related to this publication should be sent to us at AHDB Beef & Lamb, Stoneleigh Park, Kenilworth, Warwickshire CV8 2TL.



**Better Returns
Programme**

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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 profit can be significant.

This manual aims to help farmers to understand and identify specific pests that can be found amongst a flock. It provides information on how infections can spread and how to implement effective control strategies.

In this way, sheep farmers can improve the health of their flocks and deliver significant welfare benefits, which will help generate better overall returns.



Katie Brian
BRP Project Manager
AHDB Beef & Lamb

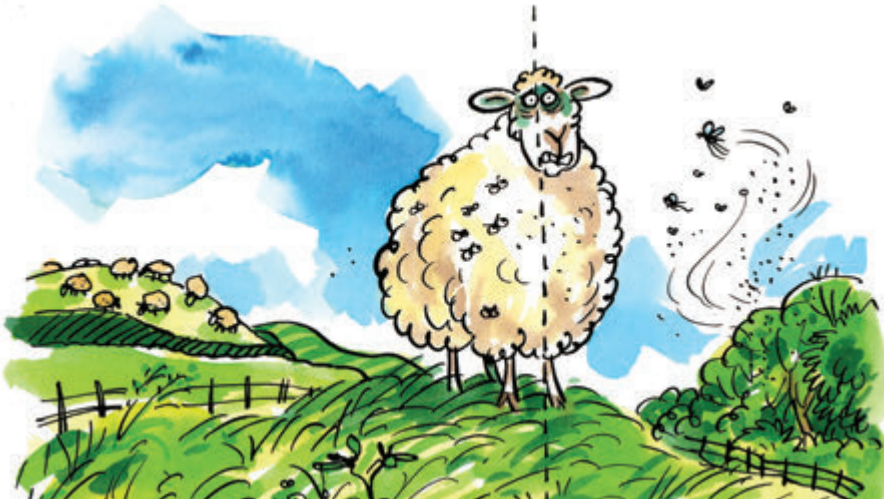
Counting the cost

External parasites are robbing the sheep industry of financial returns.

For example

£8.3 million lost to sheep scab*

£2.2 million lost to blowfly strike



There are two types of ectoparasite.

Permanent parasites

For example, scab mites which complete their whole lifecycle on the sheep.

Spread has to be by contact with infected sheep.

Semi-permanent parasites

For example, blowflies that cause strike.

Part of the lifecycle is completed away from the sheep. It is necessary to know the alternative hosts and either tackle them, or keep sheep away from risky areas, 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 chemical treatments increases.

Effective management is an important part of maintaining the limited weapons in the armoury available to sheep farmers for dealing with ectoparasites.

* Reference: G.J. Nieuwhof, S.C. Bishop, *Costs of the major endemic diseases of sheep in Great Britain and the potential benefits of reduction in disease impact*. Animal Science, Volume 81 (2005) pp23-29.

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, see www.scops.org.uk. Inspect them regularly for physical symptoms and loss of condition. If an ectoparasite is suspected, consult the vet as soon as possible. Maintain field boundaries and gates to protect stock.



Inspection

Regular inspection of a flock will alert producers 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 provide early warning of potential infestations.

Table 1: 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 ■ Medium ■ 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

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 their 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.

Cases of bovine psoroptic mange (caused by *Psoroptes ovis*) have been recorded in England and Wales. Currently, there is no evidence of cattle mites infesting sheep.



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 Lactones (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 biosecurity to avoid re-infestation. Buy all new stock from reputable sources and quarantine all incoming stock for at least 21 days.

For more information, see www.scops.org.uk.

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



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 two to four 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 the risk.

Tail docking (not less than 10cm) reduces breech strike. Controlling intestinal parasites and reducing digestive upsets from changes in diet also helps.

Cull rams and ewes that have been 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 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. The 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 red/brown, with a 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.

Itching and wool loss can be confused with sheep scab although lice can also occur alongside a scab infestation.

Control



Good biosecurity measures should aim to prevent contact with infested sheep, eg closed flocks, thoroughly cleaning transport vehicles, quarantining all incoming stock and having 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 pour-ons containing deltamethrin, cypermethrin or alphacypermethrin. Lice can also be controlled by plunge dipping with diazinon.

Some lice have developed resistance to the pour-on products described above.

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 into 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 the top of the 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 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 lifecycle in just five weeks. Females live for four to five months and 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 them as immobile pre-pupae that pupate 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 but cooler towards the fleece tip. Puparia are deposited where a suitable temperature will be found during the three weeks of pupal development. Pupae 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 has largely eliminated keds so infections are rare. Sheep identified with keds should be isolated, inspected and treated. Deltamethrin pour-on treatments are licenced to control keds.

Headfly (Semi-permanent ectoparasite)



Similar in size to house fly, with olive-green abdomen and orange-yellow wing bases.

While headfly occurs throughout Great Britain, damage from this pest has only been recorded in Northern England and the 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 the carnivorous larvae feed and grow until late autumn. Development stops in winter. Pupation occurs in May, with adults emerging four weeks later.

Timing

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

Signs

Headflies 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 headflies.

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 the lesions, large areas of skin from the head can be lost. Affected sheep are also 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 if 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, in 2006 synthetic pyrethroid sheep dips were 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:

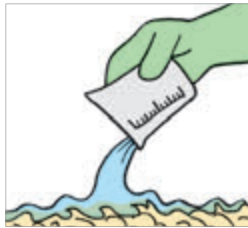
Injections

- Quick and easy
- Match dose to heaviest sheep in batch
- No risk of product loss
- Requires sheep to be penned
- Injection must be accurate



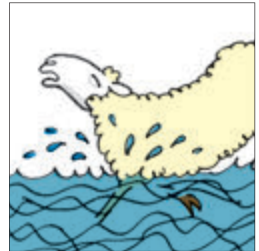
Pour-ons

- Simple to use
- Timing is critical
- May require more than one treatment
- Avoid using within three months of shearing
- Use the correct gun with recommended nozzle



Plunge dipping

- Ensure good coverage
- Dip early in the day to allow sheep time to dry
- Avoid using in hot or cold weather and heavy rain
- Stressful, especially for pregnant ewes
- Avoid using within three months of shearing
- Apply for a licence from the Environment Agency to dispose of used dipwash or arrange for a contractor to collect it
- Farmers require a certificate of competence



Shower dipping

- Plunge dip solutions cannot be used
- 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 the system and available 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 dipwash. Dipping set-ups should be inspected regularly for cracks and leaks and should never be sited next to a water course. Keep treated sheep away from water courses for 14 days after treatment.

Table 2: The efficacy of currently available ectoparasiticides in the UK

Active ingredient	Administration	Chemical	Meat withdrawal period (days)	Sheep scab	Blowfly strike	Lice	Ticks
Diazinon 60%	Plunge dip	OP	49	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%	Pour-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

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

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Non-parasitic skin diseases

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

Non-parasitic skin diseases of sheep

Hereditary/ congenital	Red foot
Prion	Scrapie
Viral	Border disease Orf (contagious pustular dermatitis) Foot and mouth disease
Bacterial	Actinobacillosis Clostridial infection of wounds Staphylococcal folliculitis Staphylococcal dermatitis Scald
Fungal	Ringworm Mycotic dermatitis
Allergic reactions	Fly bite dermatitis
Non-parasitic organisms	Forage mites Soil nematodes
Miscellaneous	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 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 diseases. Disinfect after each batch of stock.
Beware of scab and lice in winter months.

Set up treatment facilities.
Keep dips away from drains and water courses.
Treat footrot to avoid fly strike.

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

Remove soiled wool.

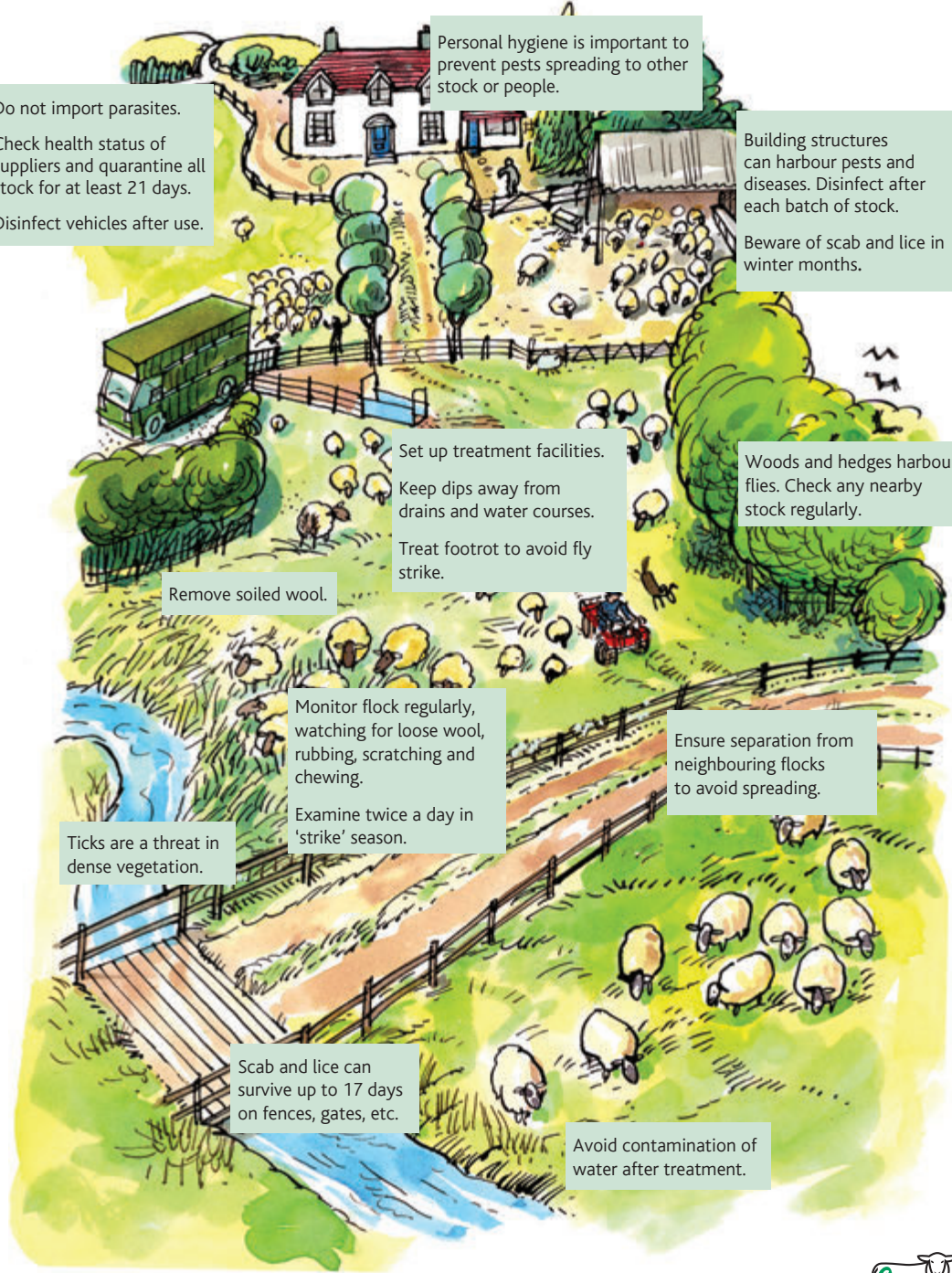
Monitor flock regularly, watching for loose wool, rubbing, scratching and chewing.
Examine twice a day in 'strike' season.

Ensure 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

Sheep BRP

- Manual 1 – Marketing prime lamb for Better Returns
- Manual 2 – Buying a recorded ram to generate Better Returns
- Manual 3 – Target lamb management for Better Returns
- Manual 4 – Managing ewes for Better Returns
- Manual 5 – Growing and finishing lambs for Better Returns
- Manual 6 – Target easier management for Better Returns
- Manual 7 – Reducing lameness for Better Returns
- Manual 8 – Worm control in sheep for Better Returns
- Manual 9 – Improving ewe breeding for Better Returns
- Manual 10 – Controlling external parasites for Better Returns
- Manual 11 – Target ewe fertility for Better Returns
- Manual 12 – Improving ewe nutrition for Better Returns
- Manual 13 – Improving sheep handling for Better Returns
- Manual 14 – Reducing lamb losses for Better Returns

Joint Beef and Sheep BRP

- Manual 1 – Improving pasture for Better Returns
- Manual 2 – 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
- Manual 7 – Managing nutrients for Better Returns
- Manual 8 – Planning grazing strategies for Better Returns
- Manual 9 – Minimising carcass losses for Better Returns
- Manual 10 – Growing and feeding maize silage for Better Returns

See the AHDB Beef & Lamb website beefandlamb.ahdb.org.uk for the full list of Better Returns Programme publications for beef and sheep producers.

For more information contact: Better Returns Programme

AHDB Beef & Lamb
Stoneleigh Park
Kenilworth
Warwickshire
CV8 2TL

Tel: 024 7647 8834
Email: brp@ahdb.org.uk
beefandlamb.ahdb.org.uk

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