

Tick Control Guidance

Scotland's Moorland Forum is preparing a range of guidance, through the Moorland Management Best Practice project, that provides practitioners, working in upland and moorland areas, with a source of information that reflects good practice and establishes a standard for accepted management techniques.

Information that is available elsewhere has not been duplicated, but a reference to it is included.

All the documents should be seen as representing evolving guidance. The aim is to review the documents at least annually so that they reflect the latest information.

Practices in this guidance, which are backed up by legislation and/or regulation, contain the word '**MUST**' in bold, letters. Failure to adopt these practices could lead to prosecution.

Parts of the guidance contain the word '**should**' in bold, lowercase letters. The actions identified in this way are not covered by legislation but land managers are expected to follow these parts of the guidance, as they represent sound, acceptable practices, which aim to achieve effective management.

This guidance has been prepared to identify for moorland managers the methods available to reduce the number of ticks (*Ixodes ricinus*) and the associated threat to the economic, environmental and public health status of moorland.

The guidance is in particular intended to help managers of sheep carry out tick control in a safe, responsible and sustainable manner.

We recognise that there are broader issues related to a range of tick-borne diseases and human and animal health which have not been fully covered in this version of the guidance. We aim to provide more information as we review and update it in subsequent editions.

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1 The Law and tick control

- 1.1 Records of acaricide use **MUST** be kept for five years, in line with other animal husbandry records, as set out in the [Veterinary Medicines Regulations 2013](#)¹.
- 1.2 The conditions included on the product data label **MUST** always be complied with as required by [The Chemicals \(Health and Safety\) and Genetically Modified Organisms \(Contained Use\) \(Amendment etc.\) \(EU Exit\) Regulations 2020](#)². These include:
- Contra-indications and warnings regarding use;
 - Operator warnings regarding protective clothing and washing and storing acaricide products in a locked store;
 - Withdrawal periods which differ depending on which acaricide product is used:
 - For Dysect, the withdrawal period is 28 days for subsequent meat consumption.
 - For Crovect, the withdrawal period for meat is 8 days.
 - Neither product can be administered to sheep producing milk for human consumption.
- 1.3 If you are the approval holder of a biocidal product under the Control of Pesticides Regulations (COPR), you are responsible for ensuring it is packaged and labelled in accordance with the [Schedule which forms part of the COPR Certificate of Approval](#)³
- 1.4 This guidance also links to information concerning the use of organophosphate sheep-dips through the Veterinary Medicines information link. Under current legislation, you will need a 'Certificate of Competence for the safe use of sheep dips'. The legislation states that at least one person involved in dipping sheep needs to have attained this qualification. This is obtained after a one-day course involving practical and theory sessions, and a short test involving use of personal protective equipment (PPE). Please visit <https://www.nptc.org.uk/default.aspx> to find out more about this course. These regulations have come into play for various reasons including (but not limited to) dangers to human health and environmental concerns.
- 1.5 Mountain Hare are fully protected under [Schedule 5 of the Wildlife & Countryside Act 1981 \(as amended\)](#)⁴. It is an offence to intentionally or recklessly kill, injure or take a Mountain Hare without a licence.
- 1.6 A licence **MUST** be held to:
- 1.6.1 Take Mountain Hare at any time of year
 - 1.6.2 Take Mountain Hare by any means including the use of: snares, spotlight, thermal imaging, semi-automatic weapons, and non-selective traps.

- 1.7 All species of deer are recognised as potentially significant tick hosts. Any control **MUST** follow the [Deer \(Scotland\) Act 1996](#)⁵.
- 1.8 Open and closed seasons for deer **MUST** be observed unless a licence for out of season control has been granted.

¹ Veterinary Medicines Regulations 2013 - <https://www.legislation.gov.uk/ukxi/2013/2033/contents/made>

² The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use) (Amendment etc.) (EU Exit) Regulations 2020 - <https://www.legislation.gov.uk/ukxi/2020/1567/contents/made>

³ COPR: Label Guidance <https://www.hse.gov.uk/biocides/copr/labelguidance.htm>

⁴ Wildlife and Countryside Act (as amended) - [The Birds Directive and Wildlife and Countryside Act 1981 | NatureScot](#)

⁵ Deer Scotland Act (1996) - <https://www.legislation.gov.uk/ukpga/1996/58/contents>

⁶ Wild Deer Best Practice Guidance - <https://www.bestpracticeguides.org.uk/>

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BACKGROUND

1 Introduction

- 1.1 Ticks and tick-borne diseases can cause major economic losses in both upland farming enterprises and moorlands managed for Red Grouse shooting.
 - 1.1.1 Tick control assists hill livestock production, reducing animal welfare concerns resulting from irritation, anaemia and the risk of disease.
 - 1.1.2 Tick control can improve red grouse survival and abundance by reducing tick biting rates and diseases.
- 1.2 Tick control may also assist survival of other ground nesting birds such as waders^{1,2}.
- 1.3 Ticks can also be a threat to public health through the risks and effects of the diseases they transmit, which include Lyme disease, a bacterial infection, The British Deer Society publishes advice about [Lyme disease and Ticks](#), and Tick-borne Encephalitis, a viral infection causing meningitis, <https://www.nhs.uk/conditions/tick-borne-encephalitis/>.
- 1.4 Combatting Louping Ill virus (LIV), a tick-borne disease of sheep and red grouse, has become more challenging in the absence of a vaccine. The Moredun Research Institute is carrying out research into a new vaccine. Controlling ticks, as vectors of LIV, is now more important than ever.
- 1.5 Mountain Hare and deer are not susceptible to LIV but they do spread LIV by transporting infected sheep ticks to different parts of a moor³.
- 1.6 More information on the range of products and their varying periods of efficacy can be found on a [Veterinary Medicines information](#) sheet, published on the Uplands Management Group website.
- 1.7 More information on Mountain Hares, which can be a wild tick host, can be found in [guidance published](#) by the MMBP Project.

2 Ticks

- 2.1 Ticks are blood-sucking parasites that feed on a wide range of host species. They can transmit diseases, such as Louping Ill and Lyme disease, that can have an impact on livestock, wildlife and humans.
- 2.2 The most common tick species in the UK is the Sheep Tick (*Ixodes ricinus*). There are three active stages: larvae, nymph and adult.

¹ Occurrence of sheep ticks on moorland wader chicks - D Newborn , K Fletcher , R Beeston & D Baines – 2009, Bird Study vol 56

² Sheep tick *Ixodes Ricinus* management on Welsh hill farms of designated conservation importance: implications for nationally declining birds – D Baines, M. Becker and S. Hart - 2019, Medical and Veterinary Entomology

³ Gilbert, L. , Norman, R., Laurenson, K. M., H. Reid H. W., Hudson, P. J. 'Disease persistence and apparent competition in a three-host community: an empirical and analytical study of large-scale, wild populations', Journal of Animal Ecology 2001.

- 2.3 The range of hosts include voles, Mountain Hares, birds (including Red Grouse), sheep and red deer. As each life stage increases in size, each stage of tick needs a larger meal of blood than the one before. This means that most adult ticks feed on larger mammals, generally the size of a hare upwards.
- 2.4 Ticks are most prevalent when their hosts, especially untreated sheep, deer and Mountain Hares are in high numbers.
- 2.5 There is some evidence that milder winters and wet summers have contributed to the increase in tick numbers since the 1980s. Increasingly warm and humid weather may be prolonging tick questing periods and shortening their breeding cycles, thus expanding tick numbers. Targeted control strategies identified in this guidance may help reduce health risks to livestock, wildlife and humans as a whole.

3 Louping Ill Virus (LIV)

- 3.1 Louping Ill is a disease caused by a virus, which is transmitted by ticks. The disease is principally seen in sheep, red grouse and some other species, and can progress to fatal encephalitis. The virus is recognized as a zoonotic agent with occasional reports of human infection, particularly those whose occupation involves contact with sheep.
- 3.2 Exposure to LIV in an unprotected sheep will usually result in neurological symptoms which cause loss of muscle control leading to shaking, loss of coordination and can ultimately lead to death.
- 3.3 Laboratory studies show that LIV infection can kill 80% of red grouse chicks.
- 3.4 Ticks become infected with LIV when they take a blood feed from a host that has high levels of the virus already in its bloodstream.
- 3.5 Adult sheep that were vaccinated, or have previously been exposed to infected ticks, tend to be immune to LIV. Lambs of such ewes are protected for the first 2-3 months of life by antibodies provided in their mother's first milk (colostrum⁴).
- 3.6 As long as lambs receive enough colostrum after birth, the antibodies from hefted ewes can provide good protection for lambs against LIV.

4 The Problem

- 4.1 At high levels of infestation (where the total tick burden on an untreated sheep is greater than 20 and LIV prevalence within the sheep flock is greater than 10%), tick burdens and associated pathogens can cause major economic losses to upland livestock farms and can also cause significant reduction in breeding success and increased mortality in red grouse.
- 4.2 High burdens of ticks are likely to reduce the fitness / health of moorland wader chicks and ultimately, their survival

- 4.3 The production of the LIV vaccine has now ceased in the UK, due to manufacturing and technological issues. The absence of this vaccine limits tick and LIV control to sheep treatment with tick-killing pesticides and managing the abundance of wild tick hosts that help ticks to survive.

5 Management options

- 5.1 Two forms of control are used in the management of ticks:
- 5.1.1 Treating sheep with acaricides (tick killing pesticides)
 - 5.1.2 Controlling the abundance of other wild tick hosts.
- 5.2 Monitoring tick biting rates on host animals can be used to refine the acaricide regime on a sheep flock to assess the need for maintaining or relaxing host exclusion or cull management.
- 5.3 Management considerations relating to the two options (treating sheep, control of wild tick hosts) are set out in the following sections 6, 7 and 8.

MANAGEMENT CONSIDERATIONS

6 Sheep Flocks

- 6.1 A comprehensive and thorough acaricide treatment regime **should** be established for sheep flocks throughout the tick questing period (start of April to the end of October).
- 6.2 Acaricide treatment plans **should** be developed with the shepherd/grazier. These need to address effective acaricide coverage, cost effectiveness, welfare of stock, and the safety of the environment and those doing the treatment. A safe and effective acaricide treatment plan may require co-operation and additional resources.
- 6.3 Effective acaricide cover while sheep are on the hill is critical. The period of time sheep are exposed to ticks between gathers **should** not exceed the length of time an acaricide is effective for on the sheep. The effective duration will vary with the choice of acaricide. More information is given in the [Veterinary Medicines information](#) published by the Uplands Management Group.
- 6.4 Moorland managers may choose an acaricide that has a long effective period to reduce the frequency of sheep gathers during sensitive times of year for breeding birds or busy periods in the farming calendar.
- 6.5 A high risk area for ticks could be considered as one where the total tick burden on an untreated sheep is greater than 20 and LIV prevalence within the sheep flock is greater than 10%. Sheep flock tick control programmes are typically specific to moors and flocks, so specialist advice **should** be obtained.
- 6.6 The effectiveness of the treatment can be assessed by counting ticks, using one of four methods:

- 6.6.1 On sheep at repeated gathers between April and October from a sub sample of the flock of approximately 10% of ewes grazing the moor.
- 6.6.2 Catching grouse chicks from the area of hill covered by the treated flock in their first two-three weeks after hatching to assess the tick burdens about their eyes and at the base of their bill. Grouse chicks with more than 15 nymphs and larvae at 15 days tend to have slower weight gain and this is associated with lower survival.
- 6.6.3 Recording tick burdens on freshly shot deer, within season or under licence, from the area of interest during the period when ticks are active (i.e. at temperatures above 7°C). If the tick burden is greater than 20 for deer, the effectiveness of the tick control programme may need to be reassessed.
- 6.6.4 Undertaking blanket drags across designated transects to physically count the numbers of tick that attach themselves to the blanket's fabric.
- 6.6.5 As previously indicated, it is important to emphasise that tick control programmes are typically specific to moors and flocks, so specialist advice should be obtained.
- 6.7 *Sheep flocks - Blood Tests*
- 6.7.1 To test for the presence of LIV, blood samples are taken from 40 sheep by a veterinary surgeon (or 10% of sheep grazing the area). The oldest age class in the flock **should** be tested as these animals will have most exposure to ticks.
- 6.8 *Sheep flocks – Acaricide record keeping*
- 6.8.1 Records of acaricide use **MUST** be kept for five years, in line with other animal husbandry records.
- 6.8.2 Records **should** include: identity of the chemical used, batch number, quantity purchased, date of purchase, name and address of supplier, expiry date(s), date placed on sheep, location of treatment facility, and date of animal sales / slaughter.
- 6.9 *Sheep flocks - Administering acaricide products*
- 6.9.1 The conditions included on the product data label **MUST** always be complied with. These include:
- Contra-indications and warnings regarding use
 - Operator warnings regarding protective clothing and washing
 - Withdrawal periods. These differ, depending on which acaricide product is used. The 2 main products currently in use are Dysect and Crovect. For Dysect, the withdrawal period is 28 days for subsequent meat consumption. For Crovect, the withdrawal period for meat is 8 days. Neither product can be administered to sheep producing milk for human consumption.

- 6.9.2 The person administering acaricide products **should** have a clear understanding of the management plan, have adequate training in dosing and have access to personal protective equipment.
- 6.9.3 Acaricide products **MUST** be kept in a locked store and managed in accordance with the manufacturer's instructions.
- 6.9.4 The products **should** always be used in appropriate conditions i.e. not in high winds; rainy days; during very hot weather; or onto wet fleeces – so that there is reduced risk of the chemicals directly entering the environment.
- 6.9.5 Stress associated with handling and dosing **should** be avoided, as it can lead to symptoms of LIV being displayed.
- 6.9.6 The use of acaricide products **should** be sensitive to the local environment and landscape, avoiding treating in areas with standing or running water. Managers **MUST** also prevent recently treated sheep from gaining access to standing or running water.

The principal acaricide products are listed in the [Veterinary Medicines information](#) published by the Uplands Management Group.

7 Management Plans – sheep, deer and mountain hare

- 7.1 Sheep and deer management plans **should** be in place and be acted upon in so far as they relate to tick management. Before any decisions are made about the necessity for further action, relevant information in the management plans **should** be taken into account.
- 7.2 Any control/management of deer **should** be backed by a deer management plan based on the Wild Deer Best Practice guidance. Further management options should be discussed with the local deer management group in the first instance. There is limited research regarding the role of deer in the transmission of LIV. Even if deer are present at low densities, LIV may be maintained just by untreated sheep or grouse, provided there are more than 25 grouse per km² which would be considered low densities for land managers looking to undertake driven shoots.
- 7.3 Open and closed seasons exist for deer and these **MUST** be observed, unless a licence for out of season control has been granted.
- 7.4 All species of deer are recognised as potentially significant tick hosts. Any control **MUST** follow the Deer (Scotland) Act 1996 and **should** be in line with [Wild Deer Best Practice Guidance](#).

- 7.5 You **MUST** have a licence from NatureScot in order to control mountain hare. Culling was previously allowed between 1st August and 28th February each year. Thenceforth, there is no longer an open season for this protected species under Schedule 5 of the Wildlife and Countryside Act 1981. Mountain hare may only be culled for limited purposes listed in section 16 of the Wildlife and Countryside Act such as, preventing damage to growing timber or crops or conserving flora and fauna. NatureScot will review and assess any licence application on its merits but having reviewed the current body of knowledge, NatureScot believes that the evidence base on the role of mountain hare to prevent the spread of tick borne diseases is not sufficiently robust to allow licensing for this purpose. GWCT is applying for a licence to carry out further research.

8 Ticks and moorland cattle

- 8.1 Although this guidance is focused on sheep management, cattle are affected by tick too and we provide some information and links to further reading in this section.
- 8.2 The most important pathogens transmitted to cattle by ticks in the UK are *Babesia divergens* (Red Water Fever), *Anaplasma phagocytophilum* (Tick-borne Fever) and Louping Ill (LIV).
- 8.3 Infections - where they are present - are usually seen where cattle are grazed extensively in rough upland and moorland settings.
- 8.4 Symptoms of Red Water Fever are anaemia, fever and blood in the urine. Diarrhoea and increased heart rate may also be observed. Mild cases can recover without treatment otherwise prescription medication is required.
- 8.5 Tick-borne Fever causes a fever, weight loss, milk drop, and pain and swelling of joints. However, cattle rarely show clinical signs. Treatment when required. is by use of antibiotic administer within the first few days of infection.
- 8.6 LIV is dealt with earlier in this document in relation to sheep. It can affect cattle but is much rarer.
- 8.7 It is worth speaking to a veterinary surgeon about the prevalence of these diseases in your area and therefore whether preventative treatments should be considered.
- 8.8 The Moredun Institute can provide further information on ticks and tickborne diseases in cattle.

9 Further information

- 9.1 The Moredun Research Institute information on [ticks and tickborne diseases](#).
- 9.2 British Deer Society advice note about Lyme Disease and Ticks
www.bds.org.uk/index.php/advice-education/lyme-disease
- 9.3 MMBP Mountain Hare management guidance
www.moorlandmanagement.org/guidance-2/management-of-mountain-hare/

- 9.4 GWCT Research: Does treating sheep for ticks reduce red grouse tick burdens
www.gwct.org.uk/game/research/species/red-grouse/does-treating-sheep-for-ticks-reduce-red-grouse-tick-burdens/
- 9.5 Best practice guidelines for LIV control in sheep flocks and on grouse moors in the absence of a vaccine
https://www.moredun.org.uk/sites/default/files/louping_ill_best_practice_booklet.pdf
- 9.6 Policy: Sustaining Scotland's Moorlands
<https://www.gwct.org.uk/media/550372/Sustaining-Scotlands-moorland.pdf>

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The members of the MMBP Steering Group are available from the [MMBP website](#), and the members of Scotland's Moorland Forum are listed on the [Forum's website](#).

Revision Table

Date	Reference	Details