



Quarantine treatments and procedures

Avoiding the introduction of resistant worms, liver fluke and sheep scab

The objective of quarantine treatments is to reduce the probability of any anthelmintic resistant (AR) worms and liver fluke or sheep scab mites being introduced onto a farm. **Quarantine treatment should be applied to all in-coming sheep.** This includes those purchased from other flocks (including rams) and sheep returning from grazing on other farms (or common grazing) where the resistance status is unknown or likely to be different from the home farm.

There are four main steps in the recommended quarantine protocols: risk assessment, treatment, isolation and testing.

Step 1: Risk assessment

Consider the risks posed by new stock being brought onto your farm. This assessment should be completed ahead of their arrival to inform what actions need to be taken to avoid introduction of unwanted parasites and/or those that are resistant.



Roundworms: Resistance has been reported against most major anthelmintic groups in the UK, with widespread resistance present against the older groups 1-BZ, 2-LV and 3-ML (see [chapter 1 What is anthelmintic resistance \(AR\)?, section 1.1 Prevalence](#)). We must therefore assume that **ALL** incoming sheep are carrying resistant roundworms and treat accordingly (step 2).



Sheep scab: Risk should be assessed using the **sheep scab risk profile** below as a guide. If in doubt choose the high-risk category.

Table 11. Sheep scab risk profile.

High risk	Low risk
Not treated prior to movement and from a farm with a known risk e.g. common grazing or in a hotspot area.	Sheep the vendor claims to have treated for scab before movement or sale.
From a market in a high-risk area and treatment unknown / unreliable.	Sheep returning from grazing that have had no contact with sheep from other farms while away.
Sheep brought in from a market, show or sale and not treated before movement.	Returning from low risk grazing with little risk of contact with other sheep.
Signs of sheep scab e.g. rubbing, wool loss.	



Liver fluke: Introduction of liver fluke, and particularly anthelmintic-resistant liver fluke should be considered when animals are coming from farms with a known history of fluke infection, or where disease status is currently unknown. Due to the seasonal nature of liver fluke infections, animal purchased in late summer/early autumn may pose a greater risk because the liver fluke are likely to be immature at this time. Anthelmintic resistance, and in particular resistance to the critically important flukicide, triclabendazole (TCBZ), which removes immature liver fluke, has been detected in several parts of the UK. If purchasing animals infected with liver fluke



the introduction of TCBZ resistance is a real risk. There are also fewer options for diagnostic testing at this time.

Step 2: Treat

On arrival, yard or house (keep off pasture) ALL incoming sheep and administer a quarantine treatment.



Roundworms: All sheep brought onto the farm should be treated with anthelmintics likely to remove both resistant and susceptible worms on arrival.

The underlying principle of quarantine treatments is that sheep are treated sequentially with **two** different broad spectrum anthelmintic groups that have the lowest frequency of resistant worms in the UK. The assumption is that in-coming sheep are carrying 1-BZ (white)-resistant, 2-LV (yellow)-resistant, and 3-ML(clear)-resistant parasites. It is particularly important to try to exclude the rarer genotypes, because it is more likely that these represent a genotype currently absent from the farm. To achieve this, sheep should ideally be treated with two anthelmintics but due to the low prevalence of AR currently reported, the use of 4-AD (orange) and 5-SI (purple) classes alone is also included in the options.

Table 12. Worming choices with gold, silver and bronze options.

Anthelmintic group	GOLD	SILVER		BRONZE	
4-AD (orange)					
5-SI (purple)					
Mox (oral drench)					

Any parasites that survive the treatment with two actives may be resistant to both but with the **gold** or **silver** standards, the risk of this is very small.

After sheep have been treated, they should continue to be held off pasture for 24, or preferably 48 hours. This time period allows worm eggs produced by worms before treatment to pass out in the faeces. After 24 hours, about 90% of the eggs will have been passed and by 48 hours, 99% will have gone. Sheep should have access to feed and water throughout the period that they are held off pasture. Faeces passed in the 24-48 hours post-treatment should not be applied to pastures that will subsequently be grazed by sheep or goats. Dispose of by incineration, composting or by application to ground that is not grazed.



Sheep scab: Where sheep are being brought in with a high risk of scab, quarantine treatments should include a specific treatment in the form of an OP dip, or injectable group 3-ML formulation with a licence of efficacy against sheep scab.

High risk sheep should either be treated (table 13), or alternatively they can be tested after 2 weeks of strict isolation (Step 4) and then treated if the result is positive.

Low risk sheep - providing these can be kept as a distinct mob for at least two weeks, these can be turned out after the 24-48 hours. After two weeks they are tested for exposure to sheep scab. If negative they can be released into the wider flock having avoided an unnecessary treatment. If positive, they are then treated for sheep scab.



Table 13. Worming choices with scab treatment - gold, silver and bronze options.

	GOLD		SILVER				BRONZE	
4-AD (orange)	Yellow	Yellow	Grey	White	Grey	White	Orange	White
5-SI (purple)	Yellow	Yellow	White	Grey	White	Grey	White	Orange
Mox oral drench	White	White	Grey	Grey	White	White	White	White
Mox (injection)	White	Yellow	White	White	Grey	Grey	White	White
OP dip	Yellow	White	Grey	Grey	White	White	White	White
Doramectin (injection)*	White	White	White	White	White	White	Orange	Orange

*Turn to pasture not grazed by sheep for at least 15 days after treatment



Liver fluke: Where liver fluke is considered a risk, triclabendazole resistance is also of concern. Sheep should, be treated with alternative products where possible to avoid the introduction of triclabendazole resistance onto the farm. Treatment on arrival with either closantel or nitroxylnil followed by a repeated treatment at 6 weeks (closantel) or 7 weeks (nitroxylnil) in combination with appropriate isolation, testing and grazing strategies for fluke (steps 3 to 6) should effectively control against the introduction of triclabendazole resistant parasites. Where acute fasciolosis is of concern, e.g in animals brought in from flukey pastures in the autumn, treatment with triclabendazole may be indicated on arrival, followed by treatment with closantel or nitroxylnil 7 weeks later.

Step 3: Isolation



Roundworms: Sheep should be turned out onto pasture contaminated with worm eggs and larvae, to minimise the impact of any worms that survive treatment on the farm's AR status.

After the initial 24-48 hours off pasture, turn quarantined sheep out separately onto isolation pastures with high levels of worm eggs and larvae. These are representative of the worm population on the farm and ensure any eggs surviving treatment are diluted by the pre-existent free-living stages present on the contaminated pasture. This will have the effect of (a) keeping the introduced resistant genes at a low frequency in the free-living population b) encouraging rapid re-infection of introduced sheep with home-farm worms as quickly as possible thus shortening the period when introduced worms are dominant and (c) minimize the chances of



resistant worms mating with other resistant worms. If contaminated pastures are not available, sheep should remain under restriction for 72 hours before release onto a small pasture.



Liver fluke: Until the second fluke treatment is administered animals should only be turned out onto dry, well-drained pastures, so that any fluke eggs shed by infected animals in the intervening period are prevented from developing establishing liver fluke and/or resistant liver fluke on the farm.

Step 4: Test



Roundworms: The efficacy of the quarantine treatment should then be assessed using faecal egg count (FEC) sampling of at least 10 sheep in the mob 14 days after treatment (see section 2.6. Test for Anthelmintic resistance (AR)). If FECs are above zero, discuss options with your vet. If counts are zero, the sheep can be released onto other farm pastures. The pasture field used initially and contaminated by the eggs of surviving worms should not be grazed by young naïve animals until after it has been heavily contaminated by grazing with high FEC sheep from the home flock, or the pasture risk can be reduced.



Sheep scab: After two weeks on the isolation pasture, sheep with **Low risk** for sheep scab can be tested for exposure using the sheep scab ELISA (blood test) or by skin scraping if obvious lesions or clinical signs are observed. If negative, they can be released into the wider flock having avoided an unnecessary treatment. If positive, they are treated for sheep scab – see table 14.

Table 14. Summary of treatment options for sheep scab.

Active Ingredient	Method of application	Withdrawal period	Length of persistency against scab	Other external parasites?
Diazinon	Plunge dip	49	60 days	Lice, ticks, blowfly, keds
Ivermectin	Injection (2 doses required)	42	No persistency	Nasal bots
Doramectin	Injection	70	No persistency	Nasal bots
Moxidectin 1%	Injection (2 doses 10 days apart to treat scab)	70	28 days	Nasal bots
Moxidectin 2%	Injection	104	60 days	Nasal bots

If an endectocide is used to treat scab it is advisable to re-test the group, using the Elisa, two weeks after treatment (before release from isolation) to make sure antibody titres have fallen confirming treatment has been effective.



Liver fluke: If fluke eggs are detected in the faeces at 21 days following treatment, failure is indicated and repeat treatment with an alternative product is necessary. It is important to note, however, that a zero egg count does not necessarily indicate successful treatment nor absence of infection due to the liver fluke's extended pre-patent period (the time it takes for them to mature into egg-laying adults) of around 10-12 weeks. The coproantigen ELISA may be useful in some instances to detect earlier stage infections.



Step 5: Join flock

Provided the above steps are correctly followed, animals can now safely join the home flock, 3-4 weeks after their initial introduction onto the farm. For fluke-infected sheep, it is important these animals continue to be grazed on dry, well-drained pasture until repeat treatments are administered.



Step 6: Re-treat for fluke

Repeat treatment for liver fluke with an appropriate product, with timing and product choice determined by initial treatment plan (step 2) and subsequent chapter 3. [Internal Parasites & Diseases, section 3.4 Liver fluke](#)). Further testing following repeat treatments may be helpful in determining whether these have been successful. Veterinary advice should be sought where treatment failure is suspected.

Note: Treatment decisions should be made in consultation with a vet/RAMA or pharmacist. Always check the product literature on the VMD Product Information Database (<https://www.vmd.defra.gov.uk/ProductInformationDatabase/>) for any changes or additional information prior to administration.