

## GUT ROUNDWORMS IN SHEEP



Nematodes – sheep gut roundworms – are likely to cause visible disease (mucky back ends and weight loss) in around 10% of the flock, but this is the tip of the iceberg: production losses due to worm burdens are likely to affect the majority of growing lambs. Both food intakes and food conversion efficiency are affected, which can reduce growth rates by up to 50%.

In the main, worms are killed in one of two ways. The sheep's immune system can expel worms: this is affected by prior exposure, nutrition, lambing, lactation and genetics, with older animals typically less affected by worm burdens. Additionally, worms will be killed by anthelmintics (wormers). Over the last couple of decades, however, sheep worms have become resistant to many wormers, so strategies for worm control have had to adapt.

A resistant worm can tolerate a dose of wormer which would normally be lethal. All worms have the genetic potential to be resistant and resistance is heritable, therefore it has the potential to increase very quickly.

*The attached diagram is a simplified explanation of how resistance develops.*

Resistance exists when more than 5% of the worms in a sheep remain following treatment (<95% kill), and will be different for wormers of different types. There are five wormer groups. In addition the degree of resistance to each group will be specific to your farm. The national picture is indicated below:

- White: 1-BZ, around since the 1960s. Largely ineffective on the majority of farms, but still useful for *Nematodirus battus*.
- Yellow (2-LV, around since the 1960s). Ineffective on around 50% of farms.
- Clear (3-AV, around since the 1980s). Resistance increasingly being detected.
- Orange (4-AD, Zolvix, 2010). Single report of resistance in a UK flock in 2018
- Purple (5-SI, Startect, 2012). No known resistance – as yet.

### What does resistance mean in practice?

Clinical improvement will be seen when treatment kills just 80% of worms present. However if the percentage kill is low, production losses will still be considerable. At key periods of production it is important to use wormers which are >95% effective, so it is important to establish which wormers work on your farm. In addition, it is vital to take steps to safeguard the efficacy of wormers on your farm.

Adult worms in the gut lay eggs which are passed out in the faeces. These can be counted by microscopic examination of dung samples (faecal egg counting, FEC), with the number of eggs present reflecting the worm burden in a sheep.

In order to find out which wormers are effective on your farm and to assess resistance levels, FEC reduction tests (FECRT) are carried out. When a high (>500epg) count is identified, lambs are wormed and re-sampled a number of days after treatment to check for a >95% reduction. More simply, a 'drench check' can be carried out, where a single sample is taken following treatment. The protocols are explained on a separate sheet (Sampling Procedure for Gut Roundworms).

## How to Prevent Resistance

Every time you worm a sheep, you are selecting for resistance, and resistant worms will have a reproductive advantage for several weeks after treatment. This effect is reduced by preserving an '*in refugia*' worm population. These worms haven't been exposed to wormer, either because they are on the pasture or are in sheep which haven't been treated. Re-infection with these worms will 'dilute' the resistant worms and slow the development of resistance.

How to worm for the Future: the golden rules

- **Dose only when necessary.** The more often you worm, the more you select for resistance. Immunity often develops by around 5 months old, with good immunity by 1 year; ewes are only likely to need treatment around lambing (unless bloodsucking *Haemonchus* is present). Use FEC and regular weighing (to identify reduction in growth rates) to help guide worming
- **Dose effectively.** Under-dosing will enable more worms to be resistant. Weigh lambs and dose for the heaviest in the group, use good *calibrated* equipment and calculate doses accurately. See more below
- **Preserve the *Refugia* population.** Allow some re-infection: either dose the whole group and delay the move to clean pasture by 4-5 days (this doesn't work with prolonged action wormers such as *Cydectin*), or leave at least 10% of the group untreated (lambs in good condition will have low burdens and will benefit little from worming)
- **Quarantine treatments:** don't bring resistant worms onto your farm! Dose sequentially with a 4-AD and a 5-SI, and use a moxidectin product if there is a scab risk; yard for 48 hours then turn out onto dirty pasture
- **Use the right product.** If you are only trying to treat Fluke, don't use a combination product. 1-BZ are still effective for *Nematodirus*, so use for black scour in Spring lambs. Do use the newer products, especially mid- to late-season to get lambs finished more quickly and clear out resistant worms which have built up over the season
- **Adopt strategies to reduce the need for wormers.** For example, rotational grazing with cattle will 'clean up' pasture for sheep. Avoid *Nematodirus* by not grazing young lambs on pasture grazed by young lambs the previous year, and use NADIS parasite forecasts to predict high risk periods.

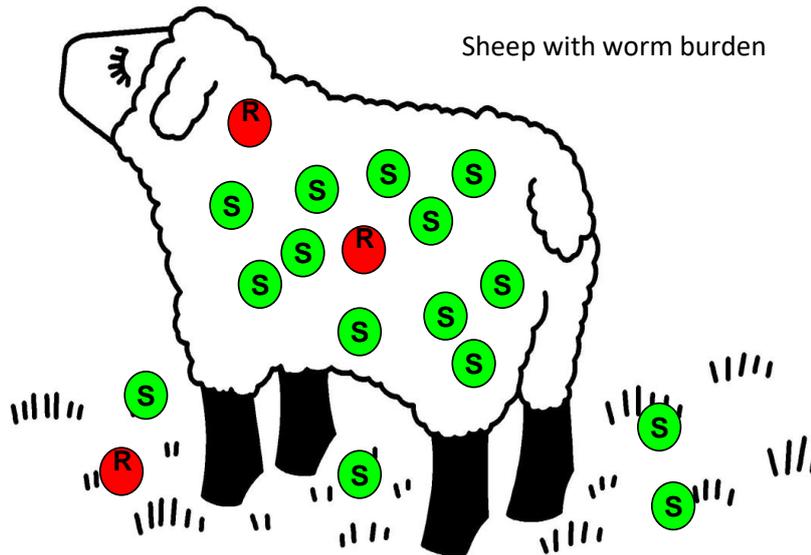
## Calibrating your equipment

This should be done every time you treat! Take the plunger out of a 20ml syringe. Set dosing gun to 5ml. Place finger over narrow end of syringe and squirt 3 doses into syringe. This should come up to 15ml mark on syringe (3 x 5 = 15).

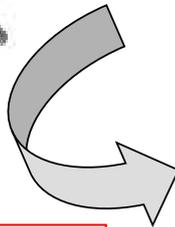
Weighing scales should also be checked, for example by placing a 20kg feed sack on the scales and checking scales read 20kg.

For the full story, visit [www.scops.org.uk](http://www.scops.org.uk)

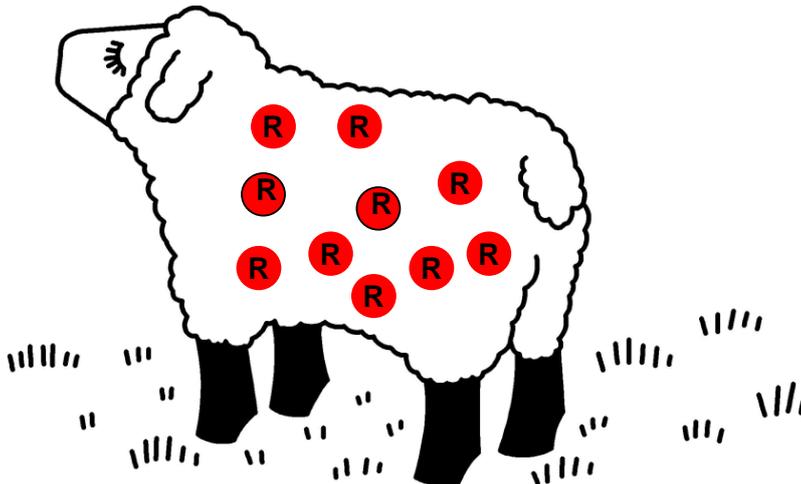
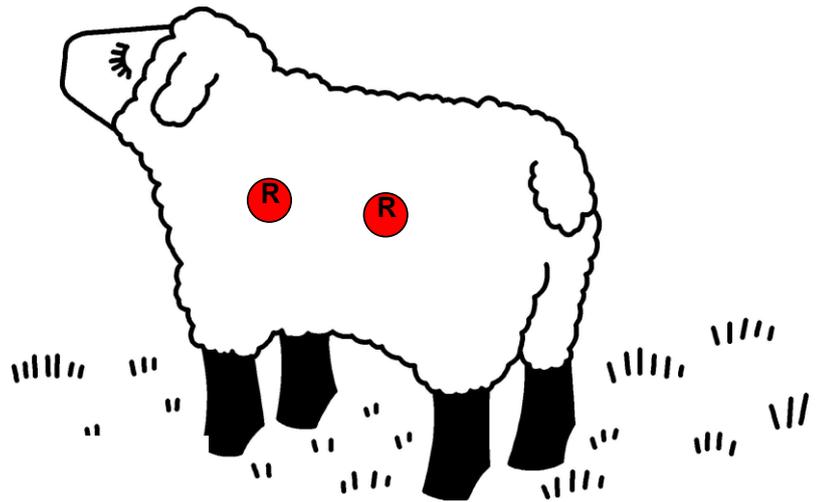
How Resistance Develops:



- = susceptible worms (killed by wormer)
- = resistant worms (tolerate wormer dose)



Worming dose kills all but resistant worms, sheep moved to clean pasture:



In the absence of other worms, resistant worms have a reproductive advantage...  
... and eventually only resistant worms remain