

Farmers looking to exploit low-contamination pastures should therefore be encouraged to use highly efficacious treatments and to leave about 10% of the flock untreated.

Farmers may be concerned by this recommendation on two counts. The first is - which sheep to leave untreated, and the second is the lost opportunity to keep a field 'clean'. On the first count, omissions could be done at random or could deliberately target sheep in good condition. One danger of selecting only sheep in good condition is that they may have substantially lower FECs than average. On the second count, the concern is well based, but the strategy is effectively a compromise between some loss of worm control and a high risk of selection for AR.

Work is ongoing in this area. In particular, workers on an EU funded PARASOL project looked to see if they could determine more accurately those animals that should be targeted for treatment (Parasol website - www.parasol-project.org). Obvious indicators are animals in low body condition; reduced growth rates and/or body weight or those with signs of scouring.

6.7.2 Delay the 'move' after the 'dose'

An alternative to part-flock treatment is to allow the treated flock to become 'lightly' re-infected before allowing them access to the low contamination pasture. This will ensure that soon after the move, contamination of the 'clean' pasture with eggs from unselected parasites will recommence. The reproductive advantage offered to the selected (resistant) parasites will be short (the pre-patent period minus the number of days the sheep were withheld after dosing) and then will depend on the degree to which the sheep became re-infected after dosing.

The number of days for which dosed sheep should be allowed to graze contaminated pasture before being given access to the 'clean' grazing will depend on variations in pasture infectivity (number of infective larvae available on pasture) and climatic factors. If the pastures are of high infectivity and the sheep reasonably susceptible to parasites (less than one year old, for example) then 4–7 days of grazing may be a satisfactory compromise between making best use of the 'clean' pasture resource and reducing the selection pressure for AR.

NB. Sheep treated with moxidectin will not become re-infected with Teladorsagia or Haemonchus for five weeks after dosing (longer for the long acting 2% LA product), so the strategy described above would not usefully reduce selection pressure on 3-MLs in those worm species. Partial flock treatments are the only option in this case.

6.8 Reduce dependence on anthelmintics

6.8.1 Strategic Prophylactic Treatments (SPTs)

Anthelmintic treatments should ideally be targeted, and based on appropriate FEC monitoring programmes on a whole flock basis (see section 8.2). As worm burdens in both ewes and lambs fluctuate throughout the year, treatments should be strategically aimed at identified potential periods of risk rather than following more conventional, suppressive treatment strategies.

6.8.2 Use grazing management

The objective of management practices is to minimise the reliance on and use of anthelmintics, by avoiding exposure to parasite burdens that would lead to clinical disease and loss of production. At the same time, management needs to allow the sheep to build up immunity to the parasites if it is to remain on the farm beyond the first grazing season. To achieve these objectives, it is necessary to understand the basic principles of risk assessment for pastures, sheep and systems and to be able to relate these to the management and monitoring tools available to the farmer. See Section 8 for guidelines.

6.8.3 Use rams that are bred for resistance to worms

In flocks that are breeding their own replacements, the resistance of the flock to worms can be increased by using rams that have been selected for worm resistance. However, in commercial finished lamb producing flocks that buy in females and finish lambs at less than 5 months of age, there is unlikely to be any advantage in using selected terminal sires. As indicated in section 3.7.5,

8.3 Risk management for pastures

	HIGH	MEDIUM	LOW
SPRING	<p>Ewes and lambs in the previous year</p> <p>For <i>Nematodirus</i> carried ewes and lambs in the previous spring</p> <p>Goats the previous year</p> <p>Store/ewe lambs the previous autumn/winter</p>	<p>Grazed only by adult non lactating sheep the previous year</p> <p>Grazed by ewes and lambs previous spring but then conserved and aftermath not grazed by sheep (<i>NB Nematodirus still high risk</i>)</p>	<p>New leys / seeds or forage crops</p> <p>Cattle or conservation only in the previous year</p>
SUMMER	<p>Ewes and lambs in the spring</p>	<p>Adult non lactating sheep only in the spring</p> <p>Cattle or conservation in the spring</p>	<p>Cattle or conservation only in the first half of the grazing season</p> <p>Forage crops or arable by-products</p>
LATE SEASON / AUTUMN	<p>Ewes and lambs all season</p>	<p>Grazed by cattle since mid season</p> <p>Grazed by mature dry ewes since weaning mid-season</p>	<p>Cattle or conservation only in the first half of the grazing season</p> <p>Forage crops or arable by-products</p>

8.4 Other management actions

8.4.1 Weaning

Action can be taken from late June, when lambs can be moved on to less contaminated areas after weaning, thereby avoiding the high levels of infectivity on pastures they have grazed with their mothers since turnout. Ewes can be left on the heavily contaminated grazing, while lambs require a much smaller area, for example an aftermath or pasture grazed by cattle since turnout.

8.4.2 Grouping lambs by age

Keeping lambs in tight age groups at turnout has benefits when it comes to the need for treatment and the utility of FECs in determining treatment requirements and other management decisions, for example weaning and withdrawal times post treatment when drawing for market.

8.4.3 Mixed grazing and Reduced Stocking Densities

The level of contamination on a pasture can be reduced by grazing cattle, (*not goats*), and sheep together. This effectively reduces the stocking density of the host species, but can make pasture utilisation more difficult. A system of rotation between the cattle and sheep during the season would address this though has practical issues.