The Elanco™ Worm control range

The sustainable guide to worm control.
Anthelmintics (wormers) are vital to control worm infections and protect against productivity losses. At present, resistant and multi-resistant worms are threatening the efficacy of existing anthelmintics.

- Resistance is the ability of worms to survive the normal dose of a wormer and pass that ability on to its offspring.
- Worms can be resistant to one class or several classes of wormer.
- Even low levels of resistance can leave enough worms behind to affect growth rates. Indeed, when the number of resistant worms is more than 10%, we start to gradually lose lamb performance because the product is not performing at its optimum level.
- A low to moderate worm burden can reduce growth rates by up to 50% without any obvious clinical signs. This is the reason why we need to act now and put a sustainable worm control programme in place.
- In the last 10 years the reports of resistance to the three older classes has been increasing.

There are five main groups of wormers available to sheep farmers in the UK.
The worm lifecycle

The lifecycle starts on pasture where stage three infective larvae wait to be eaten inside water droplets on blades of grass. Once ingested larvae travel into the gut and develop into stage four larvae and then adult worms which then begin to produce eggs.

In refugia

Worms that are not exposed to a dose of wormer eg on pasture. Avoid treating sheep when the refugia population is small. These populations are necessary to dilute the resistant worm population and stop them from becoming dominant.

Photos credited to Dr. David Bartley, Moredun Research Institute.
Nematodirus battus is a real cause for concern in the UK. Changing climatic conditions have meant that disease caused by this parasite has been a real challenge for sheep over the last few years.

The Nematodirus lifecycle takes much longer than other roundworms – up to nine months.

Eggs laid in spring develop slowly to the third larval stage inside the egg, after which they survive on pasture for up to two years. Hatching takes place after a prolonged cool period (over winter), followed by an average daily temperature of 10°C or more. If weather conditions are right, the majority of larvae will hatch at the same time (‘mass hatch’), which means that lambs are faced with a short, sharp burst of damage to their intestines, causing acute disease. If hatching is over a longer period of time, disease will not be so evident, but growth rates can suffer greatly.

White drenches eg Rycoben™ have high activity against nematodirus and there have been very few confirmed cases of resistance to white drenches in this parasite in the UK.
Immunity in sheep

By the time sheep are adults, at about 12 months of age, they develop immunity to the main species of roundworm in the UK. Their immune system will attack the ingested larvae and, prevent them from becoming established in the gut. Any that do manage to stay in the gut, have a reduced ability to produce eggs. Healthy ewes can normally withstand a challenge from roundworms without the need for any anthelmintic treatment.

Treating ewes around lambing

In late pregnancy and early lactation ewes’ immune system can come under pressure and she may allow the worms in her gut to produce more eggs for a few weeks. This is known as the peri-parturient relaxation of immunity (PPRI).

Those ewes most likely to be affected include:

- Young ewes whose immune systems may not yet be fully developed
- Ewes in poor body condition
- Those that are being underfed in late pregnancy/early lactation
- Any ewes that are fighting other diseases such as foot rot
- Ewes with a weaker immune system due to their genetic makeup

As treating ewes can be selective for anthelmintic resistance, the recommendation is to select 10-20% of the oldest, fittest ewes in the flock to leave untreated.
The sustainable guide to worm control

Faecal egg counting

The best way to determine the worm burden of sheep is to take a faecal egg count.

This involves taking 10 or more samples of fresh faeces (dung) ideally less than one hour old, from a mob of sheep. Samples should be kept cool and delivered to a vet or laboratory for analysis within 48 hours. The results will give the number of worm eggs in the combined sample presented as ‘eggs per gram’ (EPG) of faeces.

The number is an indication of the number of adult worms present in the gut of the sheep and can be used to:

1) **Tell if a treatment's been effective**
2) **Help tell if an animal needs to be treated**
3) **Provide an indication of the level of contamination on a pasture**
What is anthelmintic resistance?

Worms are considered to be resistant if they survive exposure to a standard recommended dose of anthelmintic.

This ability to survive is then passed on to its offspring and the proportion of resistant worms increases over time. Anthelmintic resistance is not reversible, so farmers should use a post drench efficacy test to check the effectiveness of the wormers they use.

The percentage of resistant worms, and the number that survive treatment, increases with time as illustrated.

The speed which resistance develops depends on how carefully and sustainably anthelmintics are used and how effectively sustainable practices are employed to address the three main selection pressures for anthelmintic resistance on worm populations in sheep: under-dosing, over-use and treating sheep when the refugia population is small.

Research from Wales Against Anthelmintic Resistance Development (WAARD) showed the majority of farms surveyed had a degree of resistance to all three older wormer classes:

94% Farms resistant to white wormers
68% Farms resistant to yellow wormers
51% Farms resistant to ivermectin
19% Farms resistant to moxidectin
To protect against anthelmintic resistance development, consider the following advice:

1) **Avoid under-dosing**: both resistant and partially resistant worms will survive if an animal is under-dosed.

2) **Avoid over use**: every time a wormer is used, that class of wormer is being selected for resistance. Reduce unnecessary use of wormers by ensuring the right product is used every time and check the resistant status on individual farms. Consider routine faecal egg counts.

3) **Avoid worming in times of low refugia**: avoid dosing and moving by either leaving 10% of the animals untreated or delay the move for a few days after treatment.

4) **Always adopt a farm protection (quarantine) treatment**: all new or returning stock should always have a quarantine treatment to ensure resistant worms or other parasites are not inadvertently brought on to the farm.
Incorporate ZOLVIX™ now for:

**Mid to late season**

By the latter part of the grazing season, most lambs will have received wormer treatments involving one or more of the group one, two or three products. Any worms resistant to these groups will have survived these treatments and, because they can live inside a sheep for months, they accumulate over the season. This population of worms in the lambs is therefore made up of a higher proportion of anthelminthic resistant worms than the population in refugia when the levels of resistance are low.

Treatment with an effective product, such as ZOLVIX™, will remove these worms and stop them from reproducing and adding their genes to the overall population. This can help slow down the development of resistance on farm. However ZOLVIX™ must be incorporated into a worm control programme when the level of resistant worms is low.

**Farm protection (quarantine)**

All sheep coming on to the farm are a risk and should be yarded and treated on arrival.

This includes both incoming stock and stock coming back on to the farm from a different holding. There are five elements to quarantine treatments.

1. Yard or house animals on arrival to stop them dropping any worm eggs on pasture.
2. Choose at least one of the newest groups of wormer to treat - eg ZOLVIX™ (4-AD).
3. Weigh sheep, calibrate equipment and make sure sheep are drenched correctly. A scab treatment can also be used at this time.
4. Continue to hold off from pasture for 24-48 hours to allow the treatment to work.
5. Turn out on to dirty pasture – pasture that has carried sheep this season.

In addition, a treatment for scab is also advised and SCOPS advises two wormers to be used. For instance if using Dectomax™ for scab control this would also act as a second wormer dose in conjunction with ZOLVIX™.
The Elanco wormer range

ZOLVIX™

- A broad spectrum anthelmintic for the treatment and control of gastrointestinal worms in sheep.
- Kills all economically significant gut worms, even worms resistant to 1-BZ, 2-LV and 3-ML wormers.
- Can be used as part of a farm protection (quarantine) treatment.
- Recommended as a mid-late season break-out dose in lambs.
- 4-AD.

When to use ZOLVIX™

- **Farm protection (quarantine) dose:** to clean out incoming stock and protect your farm from resistant worms.
- **Mid to late season break dose in lambs:** to remove worm burdens including any resistant worms.

<table>
<thead>
<tr>
<th>Bodyweight (kg)</th>
<th>ZOLVIX™ dose (ml)</th>
<th>Number treated per bottle</th>
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<tbody>
<tr>
<td></td>
<td>2.5 L</td>
<td>1 L</td>
</tr>
<tr>
<td>10-15</td>
<td>1.5</td>
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<td>31-35</td>
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<td>36-40</td>
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<td>71-80</td>
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<td>312</td>
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<tr>
<td>&gt;80</td>
<td>1.0 ml for each additional 10 kg</td>
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Dosing technique

1. Hold OPTILINE drencher with a relaxed wrist.

2. Drench from behind the animals, with them facing the same direction as you.

3. Raise animal’s jaw with your spare hand until parallel to the ground. (Not too high, this can interfere with swallowing sending drench into the lungs).

4. The OPTILINE nozzle and mouth guard’s innovative design delivers drench correctly – over the back of the tongue into the rumen. The mouth guard stops the nozzle being inserted too far and damaging the mouth and throat.
Rycoben™ SC

- Effective against roundworms including *Nematodirus battus* tapeworms and lungworms.
- The only white drench licensed as an aid in the prevention of cobalt and selenium deficiency.
- Short, three-day meat withhold.
- 1-BZ.

<table>
<thead>
<tr>
<th>Bodyweight (kg)</th>
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<td>2.2 L</td>
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<td>1250</td>
</tr>
<tr>
<td>21-30</td>
<td>6</td>
<td>833</td>
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<tr>
<td>31-40</td>
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<tr>
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<td>51-60</td>
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<td>Over 70</td>
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</table>
Dectomax™ Injection for Sheep

- Treats worms and scab with a single intramuscular injection.
- Can be used as part of a sheep scab and worm control programme.
- Effective against benzimidazole-resistant worms
- 70 day meat withdrawal.
- 3-ML.

<table>
<thead>
<tr>
<th>Dectomax™ Injection for Sheep recommended dose</th>
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<tbody>
<tr>
<td><strong>Bodyweight (kg)</strong></td>
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<tr>
<td></td>
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<tr>
<td>66</td>
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<tr>
<td>99</td>
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<td>132</td>
</tr>
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Use at 1 ml/33 kg bodyweight

Best practice advice

Effective worm kill depends on correct and accurate dosing,

- Weigh the sheep and dose the flock to the heaviest in the group.
- If there is a large weight variation, split into weight groups to avoid over or under-dosing.
- Give a full dose orally according to the dosing table. To ensure effective worm kill, and maximise the benefit of the wormer.
- Calibrate and check the accuracy of your dosing gun before and during use.
Nematodirus is the main worm challenge. Target with 1-BZ and watch the SCOPS forecast for seasonal information. Use groups 1, 2, 3 as appropriate through the grazing season. Drench check to ensure products used are effective. Remember to replace one dose with ZOLVIX™ at mid-late season.

Use ZOLVIX™ (4AD) as mid-late season break dose for lambs. This should replace one treatment from groups 1, 2, 3 during this period.

For illustrative purposes only. Consult your animal health advisor for more information.
Nematodirus is the main worm challenge. Target with 1-BZ and watch the SCOPS forecast for seasonal information. Use groups 1, 2, 3 as appropriate through the grazing season. Drench check to ensure products used are effective. Remember to replace one dose with ZOLVIX™ at mid-late season. Monitor challenge with Worm Egg Counts (WEC) and continue to monitor challenge and treat with groups 1, 2, 3, 5 as appropriate. Drench check to ensure products used are effective.

For illustrative purposes only. Consult your animal health advisor for more information.
Contraindications, warnings, etc

ZOVAX™ oral solution is a broad spectrum anthelmintic for the treatment and control of gastrointestinal nematode infections and associated diseases in sheep including lambs, hoggets, breeding rams and ewes. Spectrum of activity includes fourth larval and adult Haemonchus contortus† Teladorsagia circumcincta† Teladorsagia trifurcata† Teladorsagia davtianni Telichostrangylus axei† Telichostrangylus colubriformis Telichostrangylus vitrinus Cooperia curticei Cooperia oncophora Haemonchus contortus Haemonchus bovis Haemonchus diminutus Oesophagostomum venulosum. † included inhibited larvae.

Contra-indications and warnings: Contra-indications: None. Warnings: ZOVAX™ should not be used in lactating animals producing milk for human consumption. Efficacy has not been established in sheep weighing less than 10 kg. Care should be taken to avoid the following practices because they increase the risk of development of resistance and could ultimately result in ineffective therapy: Too frequent and repeated use of anthelmintics from the same class, over an extended period of time; Under-dosing, which may be due to underestimation of body weight, misadministration of the veterinary medicinal product, or lack of calibration of the dosage device. To help delay the development of resistance, users are advised to check the success of the treatment (e.g. clinical appearance, faecal egg counts). Suspected clinical cases of resistance to anthelmintics should be further investigated using appropriate tests. Where the results of the tests strongly suggest resistance to a particular anthelmintic, an anthelmintic belonging to another pharmacological class and having a different mode of action should be used. Special precautions for use: Safety has not been established in sheep weighing less than 10 kg or under 2 weeks of age. When handling ZOVIX™ wear protective gloves. In case of accidental spillage onto skin or into eyes, wash immediately with water. Take off any contaminated clothes. In case of accidental ingestion seek medical advice immediately and show the package leaflet or the label to the physician. When using do not eat, drink or smoke and wash hands and exposed skin after use. No special storage conditions required. Shelf life after opening the immediate packaging is one year. Adverse reactions: None. Withdrawal period: 7 days. Legal Category: POM-VPS in the UK and POM in the ROI. Disposal of unused product: Any unused product or waste materials should be disposed of in accordance with local requirements. Further Information: ZOVAX™ can be used in breeding sheep including pregnant and lactating ewes. No adverse effects were observed after a 10-fold overdose.

Rycoben

Indications for use, specifying the target species: Broad spectrum worm and fluke drench; For the control of adult and larval stages of benzimidazole-resistant gastrointestinal roundworms (Nematodirus, Cooperia, Haemonchus, Oesophagostomum, Ostertagia, Strongyloides and Telichostrangylus), tapeworms (Moniezia) and lungworms (Dictyocaulus filaria), and for the control of adult liver fluke (Fasciola hepatica) and the treatment of chronic, but not acute, fascioliasis in sheep. Oxidized to round worm eggs. Also aids in the prevention of cobalt and selenium deficiency.

Contra-indications and warnings: Sheep may be slaughtered for human consumption only 1 day after the last treatment. Do not use in sheep producing milk for human consumption. Care should be taken not to exceed the recommended dose. Ewes should not be treated at the fluke and worm dose during tupping and until one month after the tups are removed. Ensure careful handling of the ewes if used during lambing time. Frequent use or misuse of anthelmintics may enhance the development of resistance. Only use this product in areas known to be deficient in cobalt and selenium. Do not administer other cobalt and selenium supplements concurrently unless advised by your vet. If in doubt consult a veterinary surgeon. Do not dilute. Wash hands after use. As with all animal health products direct contact should be kept to a minimum. Shake container well before use. For oral administration only. For animal treatment only. Do not store above 25°C. Do not freeze. Legal Category: POM-VPS Chemical Group of Anthelmintic: 1-BZ.

Dectomax

Indications for use, specifying the target species: SHEEP: For treatment and control of Psoroptes ovis (sheep scab mite) and for the treatment and control of gastrointestinal roundworms and nasal bots. Mange mites: Psoroptes ovis. Gastrointestinal roundworms: Haemonchus nematodes, Teladorsagia, Telichostrangylus, Oesophagostomum, Cooperia, Haemonchus, Oesophagostomum, Strongyloides and Telichostrangylus. Lungworms: Dictyocaulus filaria. Contra-indications and warnings: DECTOMAX™ Injectable Solution contains 1% doramectin w/v (10mg/ml) Solution. Use at 1ml/33kg (equivalent to 300mcg/kg) to treat Psoroptes ovis (sheep scab mite) and Oesophagostomus battus by intramuscular injection. General instructions: When treating groups of animals use only the DECTOMAX™ dosing device and vented draw off apparatus. When treating individual animals syringes must be filled from the vial through a dry, sterile, draw off needle that has been placed in the vial stopper. Vial stoppers must never be broached more than 20 times. DECTOMAX™ is a clear, sterile solution. In common with other non-aqueous treatments the product contains no anti-microbial preservative. Dry, sterile, equipment and aseptic procedures should therefore be used when administering DECTOMAX™ to animals. Swab the septum before removing the dose. When the temperature of the product is below 9°C, syringability may be improved by gently warming the product. In young lambs of less than 16kg seek veterinary advice. Sheep may be slaughtered for human consumption only 70 days from the last treatment. Not for use in dairy ewes but can be used in pregnant nondairy ewes. Precautions: Wash hands after use. Do not eat or drink whilst handling the product. Be used for animal treatment only. Keep out of the reach of children. DECTOMAX™ Injectable Solution should not be used in dogs as severe reactions including fatalities may occur. Store below 30°C. Protect from bright sunlight. Do not freeze or refrigerate. Discard any product remaining 6 months after first using a vial. ENVIRONMENTAL WARNING: EXTREMELY DANGEROUS TO FISH AND AQUATIC LIFE. Do not contaminate surface water or ditches with chemical or used containers. Legal Category: POM-VPS in the UK. 1 SCOPS manual http://www.scops.org.uk/vets-manual.html

For further information call Elanco Animal Health on +44 (0) 1256 353131 or write to Elanco Animal Health (the animal health division of Eli Lilly and Company Limited), Lilly House, Priestley Road, Basingstoke, Hampshire, RG24 9NL.

Information regarding the side effects, precautions, warnings and contra-indications can be found in product packaging and leaflets; further information can also be found in the Summary of Product Characteristics. Advice should be sought from the Medicine prescriber. Zolvix, Rycoben, Dectomax, Elanco and the diagonal bar logo are trademarks of Elanco or its affiliates.