

Good Practice Regarding the Responsible Use of Anthelmintic Medicines in Livestock

What are helminths?

What anthelmintics are available for treatment?

The challenge of anthelmintic resistance

Recommendations for best practice

Animal Health Ireland
FACT SHEET



RESPONSE OF ANTHELMINTIC IN LIVE V1 September 2020



AHI gratefully acknowledges the financial and other contributions of our stakeholders.



What are helminths?

Helminths are parasitic worms that feed on and are protected by their host animal. They often cause damage to the host's organs or disrupt the host's ability to absorb nutrients.

The three main types of parasitic helminths (worms) are:

- Nematodes – roundworms (lungworm, stomach and gut worms).
- Trematodes – flukes.
- Cestodes – tapeworms.

Depending on the type of worm, infection of livestock may involve eggs or larvae being passed with the dung onto pasture. In the case of roundworms, these eggs or larvae develop into the stages that cause infection and are ingested directly off the pasture. Fluke parasites must first infect a snail intermediate host before forming a cyst on vegetation/pasture which is ingested by the animal. Tapeworms also have a lifecycle with an intermediate host. For some species of tapeworm, humans or carnivores (e.g. dogs) are the end host in which the adult tapeworm develops and livestock are the intermediate host. These can be a concern for public health and may need extra control and hygiene measures.

High levels of worm challenge may result in clinical signs of infection such as diarrhoea or weight loss, especially in young or ill animals. In many cases, clinical signs may be mild or are not seen (subclinical infections) but production may still be affected. For many types of worms, host animals develop immunity over their lifetime and adult animals typically do not get clinical disease, although there are some exceptions to this, most notably liver fluke.

What anthelmintics are available for treatment?

Anthelmintics is the name for medicines used to treat parasitic worm infections. In Ireland, these medicines are commonly called ‘wormers’. Anthelmintics generally work by either killing or paralysing worms, leading to the worms being expelled by the host animal.

Anthelmintics can be narrow or broad-spectrum. Narrow-spectrum anthelmintics work against specific types of worms, for example flukicides are usually only effective against liver fluke. Examples of the active ingredient in flukicides are triclabendazole and oxclozanide. Broad-spectrum anthelmintics can be effective against multiple types of worms. Always read the packaging to ensure the product is effective against the worm type targeted for treatment. Many different brand names exist on the market but all contain at least one of a limited number of active ingredients.

The active ingredients in broad-spectrum anthelmintics fall into five classes (Table 1).

1-BZ	Benzimidazoles and probenzimidazoles (which include albendazole, fenbendazole, oxfendazole, mebendazole) also known as ‘white drenches’ but can differ in colour.
2-LV	Levamisole also known as ‘yellow drenches’.
3-ML	Macrocyclic lactones (which include abamectin, doramectin, ivermectin, moxidectin) also known as ‘clear drenches’.
4-AD	Amino acetonitrile derivatives (monepantel) also known as ‘orange drench’.
5-SI	Spiroindoles contain derquantel plus abamectin also known as ‘purple drench’.

Not all of these anthelmintic classes are available for use in all species of livestock. Specifically, classes 4-AD (orange drench) and 5-SI (purple drench) are only licenced for use in sheep. Anthelmintics can be short-acting or long-acting (persistent).

Anthelmintics are administered to animals via different routes depending on the product. They may be given orally such as a liquid dose (drench) or bolus; by injection; or topically on the skin with a pour-on product. Anthelmintics need to be administered at the correct dose volume for the weight of the animal- heavier animals require a larger dose than lighter animals.

Withdrawal periods are also defined for each product. The withdrawal period is the minimum amount of time it takes for the animal to clear the drug from its body so that people consuming animal products (e.g. meat or milk) will not be exposed to trace levels of the anthelmintic. Farmers must comply with the withdrawal period of any medicines used.

The challenge of anthelmintic resistance

The future effectiveness of anthelmintics is threatened by populations of worms developing resistance to them. In Ireland, anthelmintic resistance is recognised in sheep and is a growing concern for cattle, specifically in dairy calves. Anthelmintic resistance is present when worms survive a dose of an anthelmintic that would normally be expected to kill them. Resistance genes are thought to occur naturally in worm populations and can be passed on to the next generation of worms. Frequent exposure to anthelmintics favours the worms that have resistance genes and over time, most worms on a farm may have inherited these genes. If a large proportion of worms are resistant to an anthelmintic, the treatment will no longer be effective. If resistance is present to an anthelmintic, treatment with any other medicine from that class of anthelmintic will also no longer be effective. Once resistance is present on a farm, it is generally considered permanent.

Every time a worm population is exposed to an anthelmintic, there is a risk of selecting for resistant worms. Therefore, methods of controlling worms in livestock that do not rely only on dosing (e.g. herd/flock health plans, grazing management) should be fully utilised. Multiple factors contribute to the increased risk of resistance in a worm population and some management practices present a particular risk including:

- Frequently dosing with the same anthelmintic class.
- Underdosing i.e. using a lower dose than indicated for the live weight of the animal.
- In grazing animals by dosing and immediately moving onto a 'clean' pasture.
- Continuing to use an ineffective anthelmintic.
- Using anthelmintics when few worms are present on pasture e.g. in a very dry season or on reseeded 'clean' pastures.
- Exposing all worms to anthelmintics e.g. treating every animal on a farm at the same time.

Recommendations for best practice

Reduce the need for anthelmintics	• Develop a parasite control plan with your veterinary practitioner • Improve grassland and grazing management • Prevent resistant worms coming onto the farm
Treat appropriately	• Treat only when needed • Administer the correct dose volume • Use good dosing technique • Choose an appropriate anthelmintic • Rotate classes of anthelmintics • Follow the withdrawal period
Safe handling	• Good personal safety practices • Observe storage and shelf-life recommendations • Dispose of packaging and unused product safely
Delay and monitor anthelmintic resistance	• Preserve a susceptible reservoir of worms • Test the effectiveness of anthelmintics used on the farm

Recommendations for best practice

Reduce the need for anthelmintics

To minimise the risk of clinical infection and production losses, **develop a parasite control plan** and review this regularly with your veterinary practitioner. Monitor worm levels with appropriate testing, for example faecal egg counts (FEC) and/or serology (testing of milk or blood samples). Consult your veterinary practitioner on the results to assess the need for treatment.

Parasite control strategies should consider the life cycle and seasonality of the parasites to ensure the correct timing for optimal effect and to prevent clinical disease. Plan the treatment for times when it will have the greatest impact e.g. treat when the worm burden is expected to be high. In general, with some exceptions, pastures are most likely to contain high numbers of infective eggs or larvae in late summer/autumn after periods of warmer weather. The pre-patent period of the worms (the time between infection of an animal and the appearance of eggs/larvae in the faeces) should also be considered, especially for those types where immature worms cause the most damage (e.g. *Nematodirus* or lung worm). Standard tests to detect worms, such as the faecal egg count, may not be useful in these cases as immature worms do not produce eggs. Use the DAFM disease forecasts for both *Nematodirus* and liver fluke to deliver treatments at the most appropriate time.

A good parasite control plan can minimise the risk of clinical infections, but animals should still be monitored for any clinical signs and reduced production performance e.g. reduced live weight gain or milk production. In clinically ill animals talk to your veterinary practitioner who will advise on the best course of action.

Improve grassland and grazing management to minimise the need for dosing animals. For roundworms, this involves using 'low-risk' pastures for animals with a high risk of clinical disease. Lower-risk pastures include reseeded fields or pastures previously grazed by adult animals. Higher-risk pastures are those previously grazed by young animals or are permanent pastures, which can become heavily contaminated over the grazing season. Pastures in the autumn will have a higher worm burden and will be higher risk than in the springtime. Adult animals can be used to 'clean up' the pasture after young animals have been grazing. In general, cattle and sheep are affected by different roundworms and they can be alternated on the pastures to minimise worm build-up. For liver and rumen fluke, pasture management includes preventing animals from grazing near wetland areas where the snail intermediate host can be found.

Recommendations for best practice

Prevent resistant worms coming onto the farm. Practice good biosecurity and quarantine animals brought onto the farm, ideally for a minimum of four weeks. Test and treat brought-in animals with a quarantine protocol as recommended by your veterinary practitioner before mixing with the main group of animals. When grazing livestock, newly purchased animals **should not** be turned-out onto 'clean' pastures to avoid potentially resistant worms becoming dominant on that pasture.

A long-term strategy is to consider breeding from animals that have shown resilience to parasites, over time increasing the resilience of your herd/flock. ICBF has developed breeding values for both beef and dairy AI bulls in relation to liver fluke. These can be considered when selecting sires for your herd.

Treat appropriately

- **Treat only when needed** as part of your parasite control plan.
- **Use the correct dose:** follow the manufacturer's instructions; dose according to the heaviest animal in a group and divide the group if there is a large variation in live weight.
- **Use good dosing technique:** calibrate equipment and make sure the anthelmintic is given by the correct route according to the manufacturer's guidelines.
- **Use an appropriate anthelmintic** that is effective against the target parasite and its life cycle stage.
- **Rotate classes of anthelmintics:** avoid repeated and frequent use with the same active ingredient and anthelmintic class.
- Follow the **withdrawal period** indicated for the product.

Safe handling

Follow personal safety measures when handling all medicines. Adhere to storage guidelines, such as temperature recommendations and shelf life, particularly the reduced shelf life of products that have been opened. Dispose of the packaging and any unused product in an environmentally safe way, with attention to potential contamination of water courses as many products are extremely toxic to fish.

Recommendations for best practice

Delaying and monitoring resistance

Delaying resistance involves following good practices for treatment (as above) and preserving a proportion of susceptible worms that have not been exposed to anthelmintics, this is especially relevant to roundworms. The technical term for maintaining a level of susceptible worms is called *refugia*. These are parasites that have not been exposed to anthelmintics and can live on pasture or in animals that have not been treated.

Strategies to keep worms in *refugia*

- **Do not treat animals and move them immediately to a ‘clean’ pasture.** Rather allow recently treated animals to continue to graze on a contaminated pasture for 4-7 days. This allows animals to become re-infected with a small number of eggs/larvae from the environment that were not exposed to the treatment. This strategy will not work for drugs with a long persistent activity e.g. many clear drenches remain active for weeks.
- Adult animals usually do not require treatment for roundworms and can be a good source of untreated worms on pasture.
- Monitor for signs of parasite infection or reduced performance to target treatment only to those groups or individuals that need it.

Do not continue to use ineffective wormers. Monitor to ensure that the anthelmintics used on farm are still effective and investigate any cases where resistance is suspected. Perform herd or flock tests, such as a faecal egg count reduction test or a drench test, rule out incorrect dosage techniques and use alternative anthelmintic classes for treatments.

Veterinary practitioners should report cases of suspected resistance to the Health Products Regulatory Authority (HPRA) or drug manufacturers for further investigation and follow-up once other causes of treatment failure have been ruled out.

Further information is available online:

Leaflets are available on the AHI website covering parasite control guidelines and information on specific parasites: http://animalhealthireland.ie/?page_id=405

www.cattleparasites.org.uk

www.scops.org.uk

www.teagasc.ie

www.icbf.com

THIS DOCUMENT HAS BEEN PREPARED BY THE ANIMAL HEALTH IRELAND PARASITE CONTROL TECHNICAL WORKING GROUP.

Chairman: **James O'Shaughnessy** (DAFM), **Charles Chavasse** (Zoetis), **Bosco Cowley** (MSD Animal Health), **Martin Danaher** (Teagasc), **Theo de Waal** (UCD), **John Gilmore** (Private Veterinary Practitioner), **Barbara Good** (Teagasc), **Fintan Graham** (Private Veterinary Practitioner), **Ian Hogan** (DAFM), **Orla Keane** (Teagasc), **Mark McGee** (Teagasc), **Grace Mulcahy** (UCD), **Mark Robinson** (Queen's University), **Maresa Sheehan** (DAFM), **Annetta Zintl** (UCD), Rapporteur: **Natascha Meunier** (AHI).

INTELLECTUAL PROPERTY

All images contained in this leaflet are the property of AHI, or have been included with the permission of the owner. Please seek permission from AHI if you wish to use these images and provide the correct attribution of ownership when reproducing them. If reusing any other material in this leaflet, please attribute AHI as the source.

IMPORTANT NOTICE - DISCLAIMER

This leaflet is issued and shall be read only on the basis that it will not be relied upon by any person as a basis for any act or omission or otherwise without obtaining professional veterinary and health and safety verification and advice and that no liability or responsibility to any person is accepted or shall be incurred, and no recourse or claim by any person will be made, by or against AHI, any stakeholder, collaborator, officer, agent, subcontractor or employee of AHI, any member of the Technical Working Group, any contributor to, author, publisher, distributor, reviewer, compiler or promoter of or any other person in respect of or in connection with the leaflet or the contents thereof or any matter omitted therefrom. No representation or guarantee is given, whether by AHI or any other such person, that the contents of this information leaflet are comprehensive, up to date, or free from error or omissions, nor that the advice provided is appropriate in every particular circumstance.

The contents of this information leaflet are not intended to be a substitute for appropriate direct advice from your veterinary practitioner. Appropriate veterinary and health and safety advice should be taken before taking or refraining from taking action in relation to the animal disease dealt with in this information leaflet. The contents of this leaflet may be updated, corrected, varied or superseded from time to time by later publications or material on the AHI website and reference should be made to that website accordingly.

Any references in this booklet or links in the AHI website to external websites or other resources are provided for convenience only and the contents thereof are not to be considered as endorsed thereby.

RESPONSE OF ANTHELMINTIC LIVE V1 September 2020



2-5 The Archways, Carrick-on-Shannon, Co Leitrim N41 WN27.

Phone 071 9671928

Email ahi@animalhealthireland.ie

Web www.animalhealthireland.ie

