FACT SHEET

Worms in Sheep

stock sense
health | welfare | biosecurity

Victorian Farmers Federation

WHAT IS AN INTERNAL PARASITE?

Internal parasites or 'worms', are one of the major causes of production inefficiency in Victorian sheep flocks. One of foremost concerns is the economic loss associated with the decline in lamb growth rates as a consequence of worms. Sheep are more frequently infected with worms than other types of livestock, as their pellet-like faeces easily disintegrate exposing worm larvae on the pasture.

There are three internal parasite groups which affect livestock. These are **round worms** (nematodes), **flukes** (trematodes) and **tapeworms** (cestodes). Tapeworms are common in sheep flocks however there is a lack of evidence to prove they have any significant effect on animal health and productivity. The main roundworm species affecting Victorian sheep production systems include:

- Black scour worm (Trichostrongylus)
- Brown stomach worm (Ostertagia)
- Barber's pole worm (Haemonchus)
- Thin necked intestinal worm (Nematodrius)

WHY MANAGE WORMS?

If worms are not managed properly, they can cause substantial economic losses. Worms can impact the productivity of your business by:

- Causing scouring, anaemia and weakness in sheep
- Reducing the growth rate of lambs
- Decreasing milk production in ewes
- Lower wool growth rate and quality
- Poor carcass quality
- Reduced marketing opportunities
- Treatment costs including drench and labour
- Death

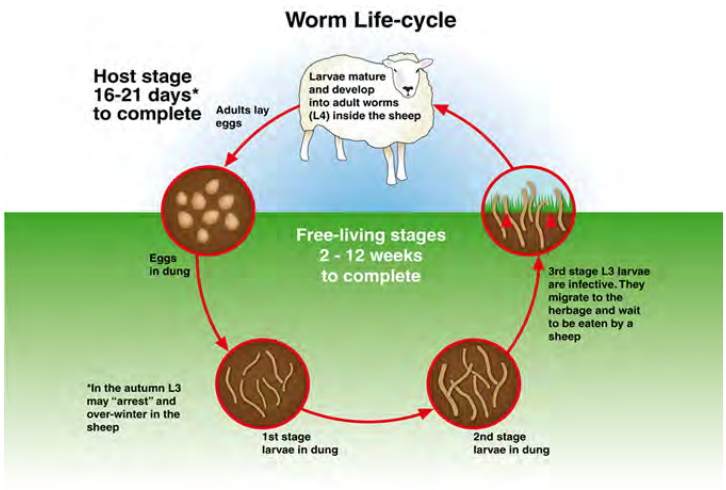
LIFE CYCLE OF ROUNDWORMS

There are many types of roundworms each affecting sheep differently, however their lifecycles are similar. The general lifecycle of a round worm consists of the female laying eggs (the number of eggs laid varies between species). The eggs hatch and progress to the 1st larval stage, followed by the 2nd larval stage and finally into the infective 3rd larval stage where they emerge from the manure onto the pasture (see Figure 1). During all three stages the larvae feed on the bacteria in the sheep's manure until they die or emerge from the manure. Once larvae have left the manure and are exposed on the pasture, sheep consume the larvae along with the pasture and become infected with worms. Worms can live in the sheep's gut for many months. Some species can live exposed on the ground for six months or longer in favourable conditions.

BLACK SCOUR WORM

Black scour worm is the most common type of internal parasite causing infection in Australian sheep flocks. There are several strains of black scour worm including, Trichostrongylus colubriformis, found in warmer summer rainfall climates and Trichostrongylus vitrineus, which prefers winter rainfall areas. Black scour worms are found in the small intestine, usually in the first three metres. Damage to the first three metres of the small intestine occurs and absorption of nutrients is impeded as a result.

Animals infected with black scour worms can develop black scours, quickly lose body condition, suffer dehydration and in intense cases death may occur. Female black scour worms can lay up to 200 eggs per day, taking around 21 days for worm eggs to appear in the manure after ingestion of worm larvae. These worms can develop drench resistance across multiple drench groups.



BROWN STOMACH WORM

The brown stomach worm is a small red-brown worm mostly found in higher winter rainfall areas. A female brown stomach worm can lay up to 100 eggs per day. Brown stomach worms are usually found on the lining of the 4th stomach, causing damage to this lining as they grow into adult worms. Sheep infected with brown stomach worm generally exhibit severe scouring and ill-thrift with death sometimes following. The onset of illness in accelerated if sheep are infected with another type of worm as well as brown stomach worm. Brown stomach worm is a robust species of worm, able to withstand frosts and also dry conditions. Adding to its resilience is the fact it is known for developing drench resistance for a number drench types. Current and effective drench resistance test data is essential in controlling brown stomach worm.

BARBERS POLE WORM

Barber's pole worms are large worms located in the 4th stomach of the sheep and are prolific egg layers, laying up to 10,000 eggs per day. Barber's pole worm is frequently found in warm, moist climates, in areas that receive summer rainfall. The worms cause anaemia by sucking the blood from the lining of the stomach and if present in large numbers can kill the sheep. Sheep infected with Barber's pole worm generally have pale gums and a significant lack of energy; however sheep can be infected without showing these clinical signs. The most precise way of detecting Barber's pole worm is by conducting a total worm count or they may be identified by a larval culture and differentiation test on the faeces.

THIN NECKED INTESTINAL WORM

Thin necked intestinal worm is found in all sheep production areas of Australia, preferring winter rainfall areas. Like the brown stomach worm, thin neck intestinal worm is a hardy worm able to withstand cold winters and drier conditions. These worms live in the small intestine with the female laying up to 30 eggs per day, which pass out through the manure. They are quite large and are easily identified in the manure. Thin necked intestinal worms are a problem as they cause intense diarrhoea in young sheep.

TAKE HOME MESSAGES:

- Worms are one of the major causes of production in the Victorian sheep flocks, reducing lamb growth rates.
- It is crucial for the economic viability of any sheep production system that worms are controlled
- Faecal monitoring is an essential component of any successful worm management plan. Contact your local vet to arrange a faecal worm egg count.
- Worm Boss is an informative website available for producers to use as a tool to help them construct a management plan specific to their region. It provides calculated answers on which seasons are likely to result in the most likely time for a worm burden.

  http://www.wormboss.com.au/sheep-

Unlike the other worms they do not cause damage to the lining of the intestine however, slight inflammation can sometimes occur.

HOW DO WORMS DEVELOP RESISTANCE?

In all populations of worms there are a few that survive treatment with a drench. Repeated treatments to the same type of drench selects these resistant worms until they make up a significant proportion of the worm population. Drench resistance is a heritable genetic trait among worms so once resistance is established in a worm population, it can only be deselected by changing the type of drench but this will take a very long time. And at the same time selection for the next drench type will be occurring.

For resistance to develop across a number of drench types, the worm population must survive each individual drench dosing. This is because different genes are responsible for controlling resistance in each of the drench groups.

Drench resistance to a particular drench group can develop more quickly due to the following factors:

- Under dosing during treatments.
- Frequent treatments
- The proportion of the worm population exposed to the drench (high in summer - low in winter)
- The mode of action of the drench
- Dominant or recessive inheritance of resistance by the worms
- The type of worm species involved
- Climate
- Inadequate grazing practices
- Lack of rotation among drench group

WORM MANAGEMENT

It is crucial for the economic viability of any sheep production system that worms are controlled. When developing an effective worm management strategy the following factors should be considered:

- Grazing practices
- Sheep management
- Drench resistance
- Faecal monitoring

Grazing practices for worm control include:

- Easing stocking rates to reduce the concentration of eggs excreted onto the pasture.
- Identifying high-risk pastures as those that have had lambing ewes, maiden ewes and weaners grazing them.
- Cross-grazing pastures with cattle. This is usually effective for most worm species which are host-specific.
- Grazing susceptible sheep on low-risk pastures. Low risk pastures include:
    - Crop Stubble
    - New pastures
    - Paddocks that have not been grazed or have not been grazed since the last summer
    - Paddocks grazed by adult cattle
    - Paddocks grazed by dry sheep over the age of two years

Sheep management for worm control include:

- Good nutrition which can influence the sheep's ability to cope with worms. Adequate nutrition has the ability to improve the efficiency of sheep being able to reject the establishment of adult worms in the body.
- Ensuring sheep have a well-balanced diet with sufficient protein. Protein is deemed to have a substantial influence in improving a sheep's resistance to worms and resilience to a worm infection.
- Reduced phosphorus levels can lower a sheep's immunity to internal parasites.
- Susceptible young stock should have access to high quality pastures and a well-balanced diet enabling them to have the best chance at coping with a worm infection.
- When re-stocking select ewes with low faecal worm egg counts. Ensure that selection is based on the number of egg counts from weaning age and the adult stage in both lambing and dry sheep.

DRENCH

There are many commercially available drenches on the market. Drenches are categorised by the active ingredient they contain, the type of worm it kills and the length of protection it offers. Before completing a drench program, drench resistance testing should be carried out on your flock. Testing allows producers to select the most effective drench best suited to their flock. The most common method is oral drenches. It is advised to contact your local vet or product advisor to establish the best drench management plan for your flock. The main classes of drench include:

- Broad spectrum; targeting all major worm species including brown stomach worm, black scour worm, barber's pole worm and thin necked intestinal worm.
- Narrow spectrum; targeting one to two species of worms such as barber's pole worm.
- Mid Spectrum; targeting parasites found in the 4th stomach or upper region of the small intestine such as black scour worm and brown stomach worm.
- Long acting; protecting against ingested larvae as well as killing any adult worms present in the body and protecting against reinfection. These drenches offer differing periods of protection.
- Short acting; only kills adult worms present in the body and then quickly metabolises.
- Combinations of broad, narrow or mid-spectrum drench with long acting or short acting protection.
- and time-consuming exercise so it is important that the right drench is selected in order to achieve effective control. Every population of worm species can be resistant to different drench groups so it is important to identify which drench group will be most effective for use on your property.

DRENCH APPLICATION

There are a number of worm treatments available, requiring different delivery methods. Methods of delivery include:

- Oral drench, by inserting the drench gun over the sheep's tongue thus delivering the drug into the rumen.
- Injectable products administered sub-cutaneously (under the skin). General principles to follow when administering drench:
- Carefully read the drug label before using the product, paying special consideration to dosage requirements, any special handling directions and particularly the withholding period and Export Slaughter Interval.
- Ensure the contents are mixed thoroughly by shaking the container before use.
- Dosage should be calculated based on the heaviest animals in the drench mob. Select a few of the larger animals and determine the heaviest weight.
- Calibrate and double-check the setting on the drench gun before commencing.
- Regularly monitor the application rate setting throughout the drenching process to ensure the right dosage is being given to all animals.

FAECAL MONITORING

Faecal monitoring is an essential component of any successful worm management plan.

- It identifies when worms are present and prevents chemical wastage and unnecessary costs when there are too few worms to justify drenching.
- A faecal worm egg count refers to the number of eggs detected in one gram of sheep manure.
- A faecal worm egg count is more accurate than visual assessment.
- Susceptible stock need to be monitored closely e.g. weaners, lambing ewes and maiden ewes.
- Faecal samples can be collected fresh from the ground or by using a gloved hand to retrieve manure directly from the sheep's rectum.
- When collecting samples from the ground, sheep should be held in a corner of a yard or paddock for 10 minutes before moving away. Around ten samples should be collected at random and bagged and labelled for analysis.
- Obtaining samples directly from the sheep's rectum is a preferred method when drench resistance testing as it allows for individual samples to be collected.
- Contact your local vet to arrange a faecal worm egg count.
- Farmers are able to conduct their own faecal worm egg counts however appropriate laboratory equipment and

training is required. Contact your local DPI office for further information.

DRENCH RESISTANCE TESTING

Implementing a drench program is essential in controlling worms to prevent production losses. This can often be a costly and time consuming exercise so it is important that the right drench is selected in order to achieve effective control. Every population of worm species can be resistant to different drench groups so it is important to identify which drench group will be most effective for use on your property. A faecal egg count reduction test (FECRT) is the most effective and commonly used resistance test. Young sheep less than 6 months old that appear wormy and have not been drenched are ideal for this test. An initial worm count of at least 300 eggs per gram from the selected sheep is needed to conduct a FECRT.

Before performing the test you should consult with your local veterinarian about the right approach to the FECRT method or if another test would be better suited to your situation. The general method for a FECRT is as follows:

- Randomly draft test mob into groups of 15 animals
- Selection of one or combination of drug treatments per group of animals. Each group should be assigned a different drench group. One group must remain untreated to act as the control group for the final sampling.
- Marking each drench group of animals so they can be easily identified.
- Each group of animals receives their respective drench treatment based on the heaviest animal in each group.
- Once treated, sheep are able to run together or in different mobs until it is time for sampling.
- After 10-14 days following treatment, sheep should be yarded and drafted into their treatment groups.
- Individual faecal samples from each group including the control group are required. This is why it is important to effectively mark the sheep at the beginning of the trial.
- Samples should be bagged separately and labelled according to the drench treatment given.
- Samples should be submitted to a laboratory within 12 hours. If this is not possible, then samples may be chilled but not frozen until submission.
- Individual worm egg counts and possibly a larval culture is carried out.
- The results are interpreted by comparing the number of eggs from each drench group against the number of eggs detected in the control group.
- If a drench group fails to reduce worm egg counts to less than 95 per cent of the initial control group count, this indicates resistance to that particular drench group.

For more information, please contact Stock Sense by email on stocksense@vff.org.au

FURTHER LINKS

Department of Primary Industries Victoria

https://www.agric.wa.gov.au/livestock-parasites/sheep-parasites

Meat and Livestock Australia

Worm Boss

http://www.wormboss.com.au/sheep-goats/programs/sheep.php

Tasmanian Government

https://dpipwe.tas.gov.au/biosecurity-tasmania/animal-biosecurity/animal-health/sheep/internal-parasites-in-sheep

Zoetis

https://www.zoetis.com.au/livestock-solutions/sheep/effective-parasite-management/internal-parasites-lifecycle.aspx

Small Farms

https://smallfarms.oregonstate.edu/sites/agscid7/files/em9055.pdf