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wormwise
FOR DAIRY

'Wormwise for Dairy' **is a summary of the important points from the existing Wormwise resource, adapted for dairy heifer systems. Refer to the full Wormwise handbook for more extensive information.**

Managing internal parasites in calves

How can worms limit production in dairy calves?

Calves are born with no protection from worms. When young cattle are challenged by worms it comes at a cost and can result in production loss. It is a common misconception that established worms inside the gut cause the greatest losses, and that regular drenching to remove these is all that is required.

However, substantial impacts occur when infective larvae (which emerge from eggs in the faeces) are consumed whilst growing calves are eating pasture. These incoming larvae (and further life stages within the gut) initiate a cascade of immune responses in the calf, that, if left unchecked, result in obvious ill-thrift and disease:

- The daily ingestion of high numbers of worm larvae directly reduces appetite and daily feed intake.
- Incoming and developing worm larvae kick-start an immune response, which includes protein and fluid secretion into the gut; we see this as scouring.
- There is less efficient absorption of nutrients from the gut.
- Larvae and adult worms can cause physical damage to the gut lining - by this point significant production losses have already occurred.

While drenches remove most of the adult worms and larvae from within the gut whilst the drench is active, they do not prevent the ongoing ingestion of more infective larvae. The aim for worm management in young stock should be to reduce the amount of larvae consumed in the first place.

Where there is animal poo there are worm larvae, and where there is worm larvae there is production loss. You cannot stop animals pooing but you can manage them in a way that reduces the amount of larvae the next group of animals will eat.

At any one time, most of the worm population (up to 95%) is on the pasture, rather than inside the gut of cattle. Therefore, effective controls should minimise pasture contamination with worm larvae. This will minimise the exposure of susceptible stock to worm challenge.

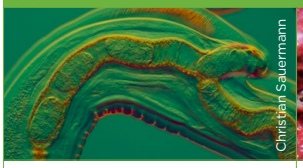
Ways to reduce larvae on pasture:

- Adult cattle are less affected by parasites and generally consume more worms than they put out. Use older cattle to help remove larvae from paddocks. Prolonged grazing by older cattle can help set up blocks for calves to graze, and adult cattle can follow calves in a rotation as 'vacuum cleaners'.
- Cross graze paddocks with different species of animals. Sheep and cattle share few parasites; as sheep eat grass they also consume and remove cattle worm larvae.
- Use forage crops to help reduce the reliance on drench and reduce larvae intake. The process of cropping/re-grassing removes much of the existing larvae in a paddock, providing a much cleaner and better quality feed for calves.
- Resowing paddocks and leaving them fallow during hot dry periods helps to reduce larvae present.
- Crop rotations such as maize to annual grass result in a sward with very low levels of worm larvae which are ideal for young calves.
- Hay and silage aftermath can have reduced levels of worm larvae also.
- All of these options above reduce the challenge but also reduce the number of worms in *refugia* (see below). Care is needed when planning any drenching programme, so you don't select too strongly for drench resistance.

Worm Biology

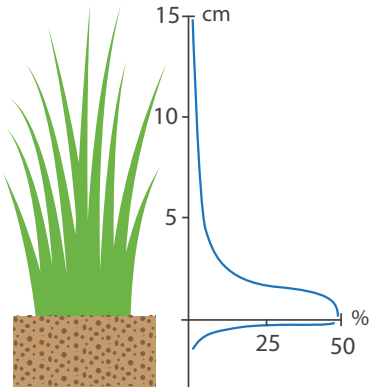
The common roundworms of cattle have three phases to their life cycles: egg, larvae and adult. The life cycle takes between 21 and 28 days to complete in optimal conditions. The egg is deposited in faeces which then hatches and turns into larvae. Infective (L3) larvae migrate up grass blades in films of water for grazing animals to consume, therefore continuing the cycle.

Much like plants, larvae and eggs need moisture and warmth to progress. Optimal growing conditions for grass create optimal growing conditions for worms too. When temperatures drop, the life cycle slows down. If it gets dry for long periods of time larvae die off.

Gut worms	Lungworm	Liver Fluke
 Christian Sauermann		
Ostertagia and Cooperia are the predominant roundworms in cattle. Ostertagia cause more severe production losses than Cooperia. Cattle appear to develop immunity to Cooperia more quickly than they do Ostertagia.	Lungworm have a slightly different lifecycle in that the adult form lives inside the lungs rather than the gut. This can cause irritation and difficulty breathing in affected calves. Lungworm thrives in the warmer months.	Liver fluke require a freshwater snail to complete their life cycle. Cattle grazing near creeks & bogs are most at risk of fluke infections. The initial fluke infection generally takes place before winter while the temperatures are warmer, but the adult flukes can be carried through the winter in the animal's liver.

There are more eggs and larvae on pasture than parasites inside the animals.

Intensive grazing exposes animals to more larvae compared with animals lightly grazing the same pasture.



Avoiding consumption of larvae

Most worm larvae live in the bottom third of the pasture and the top 1cm of soil. On a typical dairy farm most adult cows do not graze below this level but young stock on grazing blocks often do.

The greater the pasture allowance, the less likely cattle are to graze the contaminated bottom 2.5cm of the pasture. A greater pasture allowance also offers better nutrition which in turn allows a more effective immune response when larvae are eaten.

Calves act like 'parasite factories'. Full immunity to parasites is not well established in cattle until around 18 months of age. Calves produce a lot more parasite eggs than cows do, and these eggs have greater development potential; thus calves are the major source of worm contamination.

The 'Clean' pasture concept

Pasture is considered 'clean' when it has a low level of parasite contamination. While no pasture is ever completely free of parasites, some pasture is cleaner than others; for example:

- pastures that have been resown after a period of cropping.
- pastures that have had a different stock class graze them for a long period of time, e.g. paddocks used for sheep are then converted to cattle paddocks.
- Pasture that has been spelled and cut for silage.

Ideally dairy grazing blocks should be managed in a way that different paddocks/blocks are 'cleaned' each year to avoid areas becoming heavily contaminated with larvae. Using the same paddocks as calf paddocks year after year will build larvae levels as the years progress.

Clean pastures need careful management or they can become repopulated with resistant worms. If animals are drenched and then immediately put onto very clean pasture the only worms developing on that pasture will be the ones that survive the drench (resistant worms).

It is best to return cattle to a contaminated area after drenching so that they have time to consume larvae that are susceptible to the drench. The susceptible worms can then breed with any resistant worms that have survived the drench which will help to dilute out the resistant genes.

Seasonal effects of parasites

Calves that are born in the spring can start cycling parasites once they have a functioning rumen (6-8 weeks of age). Although calves will consume grass prior to this; limited parasite development occurs until the rumen is functional. From this point, the life cycle of the parasites occur repetitively and larval contamination on the pasture builds. Calves born later in the season will face a greater larvae challenge due to this build-up and can take longer to reach weaning weight.

Calves carry their greatest burden of worms into their first winter. As their second spring arrives, their immune system starts to limit worm numbers in the gut. Pasture cover increases too, diluting the larval challenge that is present on the pasture from the previous season.

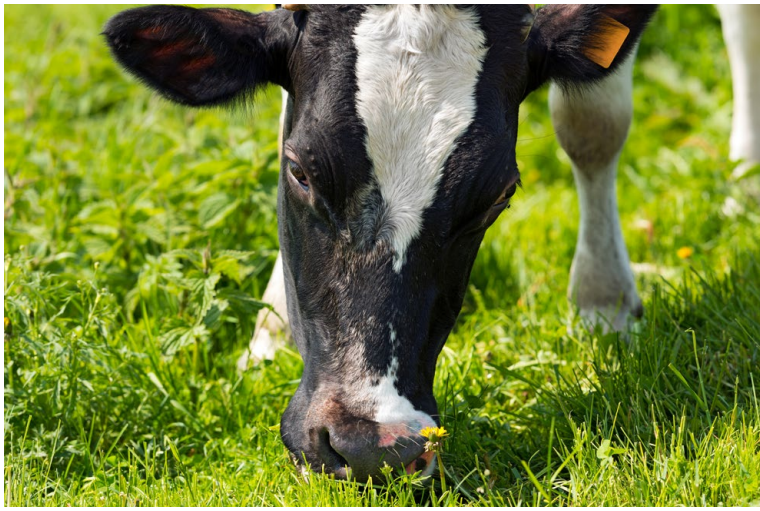
Infective larvae can survive in dung pats for long periods of time throughout the winter. In systems where the same calf paddocks are used year after year, the larval burden on the pasture continues to build resulting in significant production losses. Adult cows can be effective at removing larvae. Graze cows in calf paddocks whenever possible and/or look for other ways to create 'clean' feed for young calves.

How to test for parasites:

A faecal egg count (FEC) is a physical count of the concentration of worm eggs present in the faeces and is the main tool used to determine if parasites are present. This information can be useful in determining when/if calves require a drench, or if parasites are the likely cause of symptoms such as scouring.

You should check how well your drench is working at least once a year for each type of drench. A 'drench check' is where a FEC is taken at 10-14 days post drench. If parasite eggs are still present in the faeces at the post-drench check it is possible that the drench is not working and requires further investigation.

Regular weighing of cattle can also be used to monitor the success of a parasite management plan. Remember failure to gain weight can be caused by many factors, however a heavy parasite challenge will have a significant effect on weight gain.



Drench Choice

- Always use the most effective drench available to help reduce the chance of resistance developing. You need to test, to know which drenches are highly effective.
- Use an oral drench in calves for as long as possible. Subsequently injection should be next choice. Pour-ons show variability in the amount absorbed, deliver the least amount of drug to the worms and are often more expensive. A pour- on has to go through multiple tissue systems to get to where the parasites are.
- Try to use combination drenches; triple combinations are likely to be more effective than singles or doubles. If there is resistance to one drench family, the second and third part of the combination drench can act as a back-up.
- For cattle up to 12-15 months of age, drench treatments should contain levamisole to control Cooperia. This worm is resistant to 'mectin drenches on nearly all NZ cattle farms.
- If drenching rising 2 year olds, use a drench with a 'mectin' component to target Ostertagia in the 4th stomach.
- On farms where cattle can still access grass in bodies of fresh water, liver fluke can be a risk and use of a product containing a flukicide may be required, if monitoring shows fluke to be present. Treatments are typically given in late autumn and/or winter. Consult your local animal health professional.

Who to drench and when:

It is important that not all parasites are exposed to drench all of the time, to prevent the escalation of drench-resistant worms. *'Refugia'* refers to a part of the worm population that is able to reproduce without having been 'screened' as drench survivors first – they are taking 'refuge' from the drench.

Ensuring that drench intervals allow time for some non-resistant worms to develop and reproduce in calves, whilst maintaining growth and health, is a farm by farm, season by season and even paddock by paddock process.

Monitoring is an important component. Seek help from someone with expertise in parasite management.

In some cases, a portion of a mob can be left undrenched at each round of drenching to maintain worms in refugia. This helps to reduce the chance of resistance developing as there are always susceptible parasite genes available to help dilute the genes of the resistant parasites.

Targeted selective treatment (TST) involves treating only the portion of the mob that requires it. Animals that are failing to meet weight gain targets, or showing visual signs consistent with parasite challenge are treated, while the 'top' are left untreated. This also helps to provide refugia.

Seek advice from an expert with good parasite and farm systems knowledge before instigating TST. Typically it would not be started in very young calves.

Summary

The most common question farmers ask in relation to worms is "what drench should I use?".

Drenching is just one tool within a much bigger management system to control the impact of parasites. Start instead to ask yourself "what management factors can I change to reduce my reliance on drench?".

- Cross graze cattle with sheep or alternate between calves and adult cattle in your grazing system.
- Forage crops provide lower worm challenge feed and promote better calf growth through feed quality.
- Use crop rotations and hay/silage cuts to strategically to reduce larvae present on pasture.
- Very well-fed calves that do not graze into the base of the pasture will ingest less worms and grow better as a result.
- Do not drench animals directly onto 'clean' pasture.
- Test your drenches, so that when you do treat, you are leaving as few resistant parasites behind as possible.

References

Leathwick D.M, Miller C.M; Efficacy of oral, injectable and pour-on formulations of moxidectin against gastrointestinal nematodes in cattle in New Zealand. Veterinary Parasitology, 2013 Jan 31; 191 (3-4): 293

McAnulty R.W, Gibbs S.J, and Greer A.J; Liveweight gain of grazing dairy calves in their first season subjected to a targeted selective anthelmintic treatment (TST) regime. Proceedings of the New Zealand Society of Animal Production 2011. Vol 71: 301-303

Brunsdon R.V; Principles of Helminth Control. Veterinary Parasitology, 6 (1980) 185-215 185

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