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By Dr Natasha Hovanessian, BVSc, MS

Parasites

Control Strategies

Intestinal worms are present in all horse, pony, donkey and mule populations worldwide, and are considered the major health problem of these species.

Recent research findings have changed our understanding of worms and how to manage them and, in this article, Dr Natasha Hovanessian from the Canberra Equine Hospital addresses the changes and informs of current recommended management practices for all horses.

Signs of worm infestation are quite variable. The most common signs include poor growth, weight loss (looking 'ribby'), poor coat, colic (mild to severe), tail rubbing, diarrhoea (loose or soft manure), lethargy and lack of energy, anaemia (low red cells) and possible death.

Types of Worms

Large strongyles

Large strongyles include *Strongylus vulgaris*, *Strongylus equinus* and *Strongylus edentates*.

Mature female strongyles produce eggs that are passed in the faeces. The larvae move to the grass nearby and are picked up and swallowed when horses are grazing.

The strongyle lifecycle involves migration of larvae through blood vessels of the intestine and liver, where they cause inflammation and obstruction of the vessels. This causes disruption of blood supply to the bowel.

Horses infested with strongyles may have colic, ill-thrift and diarrhoea, however, this parasite is far less common today than it was 20 to 40 years ago.

Small strongyles

Cyathostomes or small strongyles are the primary worm of concern in the horse population today.

Small strongyle eggs shed on the pasture and remain infectious for at least five months and up to nine months in suitable (cooler) climatic conditions.

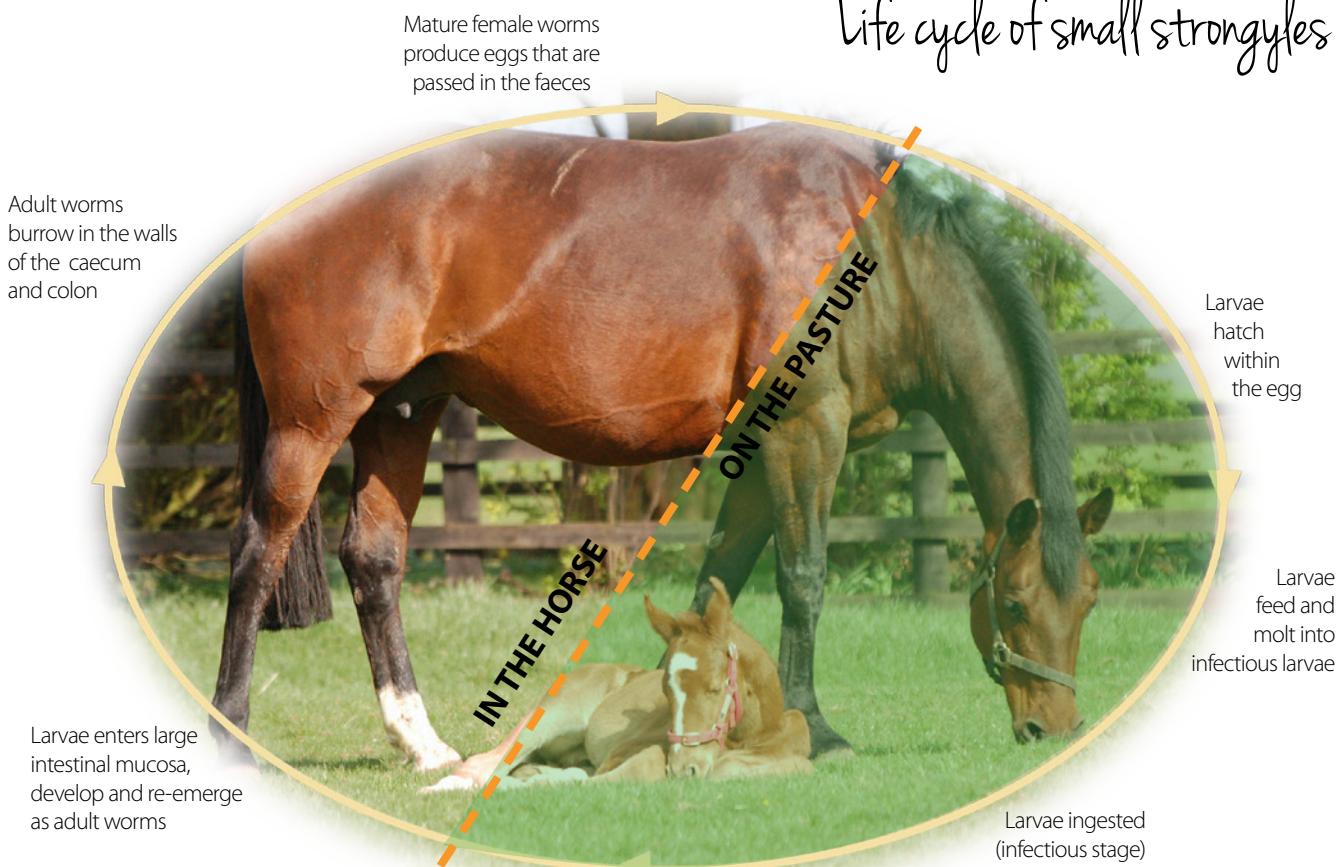
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Life cycle of small strongyles



When ingested by the horse while grazing, the worm larvae burrow into the gut wall where they encyst (hibernate) for many months or even years. They tend to emerge and migrate through the gut in the Spring and Summer, causing clinical signs. Migrating larvae through the gut can cause severe damage to the large colon, resulting in weight loss, colic and diarrhoea.

Encysted small strongyle larvae in the gut wall can cause severe inflammation and a thickened wall can result.

Tapeworms

Anoplocephala perfoliata, commonly known as tapeworms, produce erosions of the gut mucosa at the attachment site, where they latch on in clumps.

They cause impactions in the portion of the bowel that goes from the small intestine to the caecum (first part of the large intestine) and mild to severe, intermittent colic signs from slowed bowel motility.

Weight loss rarely occurs with tapeworm infestation.

Definitions you should understand

Anthelmintic:

Another name for a drench, wormer or de-wormer.

Parasite Resistance:

This occurs when worms survive drenching and pass on their resistant genes to the next generation.

Refugia:

This is one of the biggest advances in the understanding of how drug resistance develops in worms. It is important to have genetic variety in worm populations to avoid only resistant worms breeding and becoming the majority of the population. This includes worms in an individual horse, paddock, farm and region.

The population of worms that 'take refuge' (hide) and survive after drenching is called the 'refugia'. Genetic variety in the refugia will continue to make worms susceptible to drenching by diluting the population of resistant worms. Excessive worming, on the other hand, removes a large amount of refugia and encourages the development of resistance.



Above: Small strongyle in manure. Image courtesy of the University of Queensland.



Above: Parascaris (roundworms). Image courtesy of the University of Queensland.



Above: Video of bot fly larvae crawling in the mouth of a horse. Bot maggots can burrow into the gums leaving behind deep pockets that lead to infection and periodontal disease. They are not affected by regular drenching, and must be identified and treated by your Equine Dental Veterinarian. Watch the video at: <http://edvtv.com/tv/bot-fly>

Roundworms

Parascaris equorum or roundworm is most important for causing ill-thrift and poor growth in foals.

Migrating larvae may cause coughing and nasal discharge. Large infections can cause blockage (impaction) of the bowel and subsequent rupture (which is not treatable).

Parasite eggs can remain in the soil for several years.

Immunocompromised adult horses can also be susceptible to roundworm infections.

Bots

Known as *Gasterophilus* species, bots are not a worm but the larvae of a fly.

The adult bot fly deposits her eggs on the horse's hair, usually the forelegs, and the horse ingests the eggs when he scratches those areas with his teeth.

The eggs hatch in the horse's mouth, and the larvae (maggots) burrow into the gums where they live, grow and feed on blood and bacteria. When they leave the gum and migrate to the back of the mouth to be swallowed and reach the stomach, they leave behind deep bleeding pockets in the gum. These periodontal pockets pack with feed and lead to infection, bone loss, tooth mobility and pain.

While boticides are effective at killing *gasterophilus* spp they work on direct contact with the parasite. So, simply worming your horse will not kill the bots in the horse's mouth. This needs to be identified and treated by your trained Equine Dental Veterinarian. After the removal of most or all the bots, the pockets need to be cleaned and filled with a boticide wormer.

The bots that reach the stomach are third stage larvae that attach to the stomach lining and cause irritation. Daily removal of the bot eggs from the haircoat will significantly reduce infection.

Pinworms

The secretions from female *Oxyuris equi*, or pinworm, when they are laying eggs around the anal and perineal region (under the tail) of the horse are very itchy.

Relatively mild disease causes intense tail rubbing and hair loss around the tail.

Eggs can persist in the stable, on grooming tools, on fence posts and in the environment for long periods. Hot water and disinfectants will help kill the eggs.

Threadworms

Strongyloides westeri usually infect the intestines of young foals and this parasite can be transmitted from mares to foals via the milk.

Typically, a foal will develop a strong immune response and the infection is kept under control as the foal matures. Nevertheless, when large doses of larvae are swallowed and foals are overcrowded or immunocompromised, severe diarrhoea can occur.

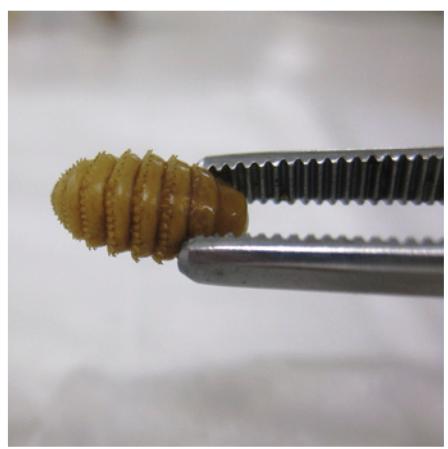
Below: Bot eggs on a horse's foreleg. Daily removal of the eggs is the best way to reduce infection. Photo by Cristina Wilkins.

Right: Third stage bot larvae. Image courtesy of the University of Queensland.



Lungworms

The larvae of *Dictyocaulus arnfieldi*, or lungworm, can be found in the lungs of horses that live with donkeys, and can cause parasitic bronchitis and bronchopneumonia.

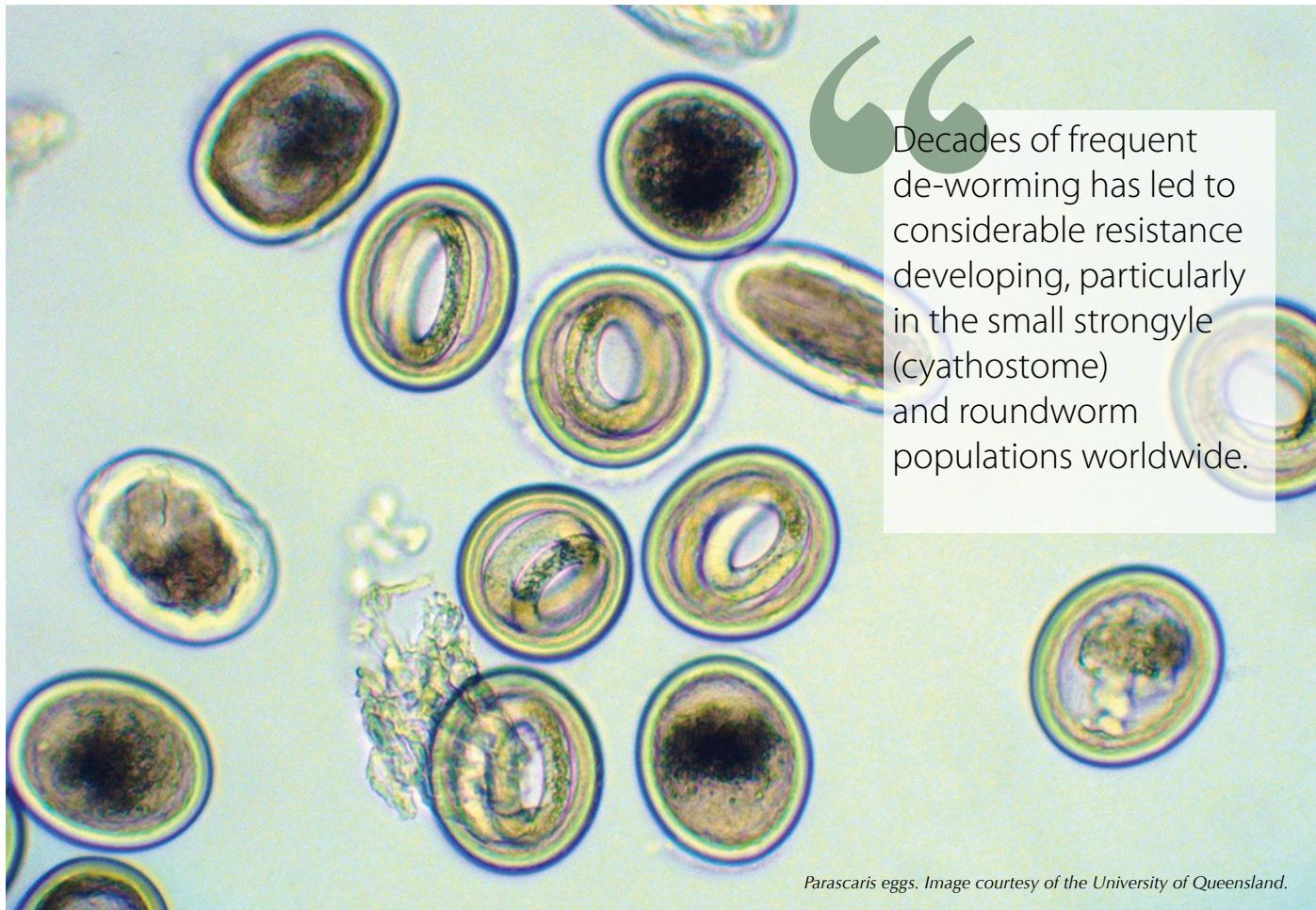


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To celebrate August 1 the horses birthday Equine Dental Vets nationwide are giving back to horses by providing free dental care and horse friendly treats to horses working in charities around the country.



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“Decades of frequent de-worming has led to considerable resistance developing, particularly in the small strongyle (cyathostome) and roundworm populations worldwide.

Parascaris eggs. Image courtesy of the University of Queensland.

Revamping parasite control in horses

Decades of frequent de-worming has led to considerable resistance developing, particularly in the small strongyle (cyathostome) and roundworm populations worldwide.

The traditional approach of consistently de-worming at regular two-monthly intervals and rotating de-wormers has created the resistance issue, and the scary part of this is that there are no new de-worming drugs expected to come onto the market for at least the next decade.

This means we have to work with the de-wormers that are available and use them sensibly to reduce resistance in our equine populations.

Reviewing de-worming practices

The concept of de-worming every two months came about around 40 years ago, when large strongyles were the main worm in horse populations and caused frequent death from ruptured blood vessels. Because large strongyles have a two month life cycle, treating for them at regular intervals reduced this problem in the horse and now we very rarely see large strongyles in horses.

However, over these four decades, small strongyles have evolved to be the main parasite in horses and all grazing horses are infected.

Thankfully, small strongyles only cause disease when a horse has an extreme infestation and it is normal, and actually useful, for a horse to live with a low worm burden of small strongyles. This is called a refugia, basically the population of worms that ‘take refuge’ or hide, and are not affected by the de-wormer. (See text box on Page 13).

As the small strongyles and other parasites that are the primary concern today have different life cycles to the large strongyles we treated in the past, it is not helpful, and actually detrimental, to drench horses every two months.

Key concepts to keep in mind for a de-worming program

Please speak with a veterinarian to develop a plan that is tailored for your horse and management practices.

Adult horses (under three years of age) and young horses (under three years of age) need to be managed differently, due to different susceptibilities to parasites.

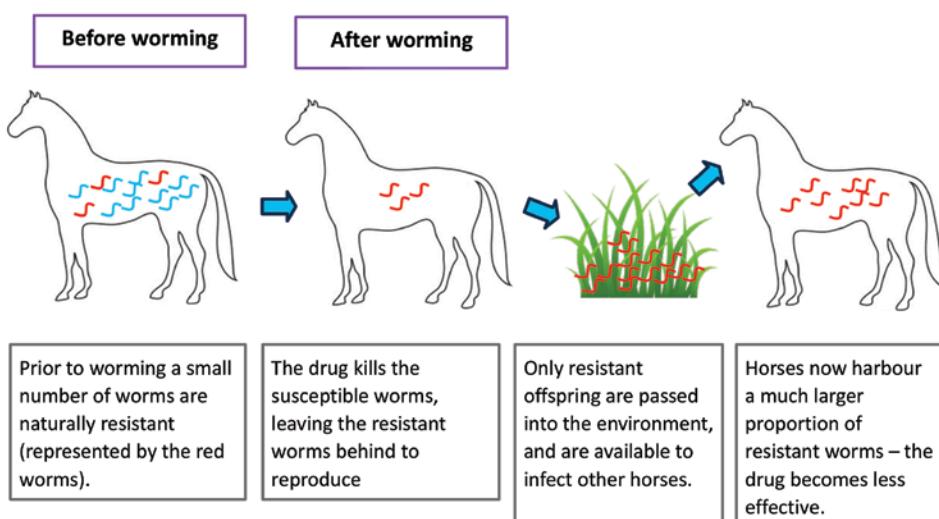
Adult horses are mainly infected with small strongyles, while young horses are more commonly infected with roundworms. Tapeworms can cause colic in any age group.

Every individual horse has inbuilt differences in their susceptibility to parasites.

Horses that are more susceptible to having worms will remain more susceptible their entire lives. These horses will always shed more eggs into the environment and are called ‘high shedders’. In fact, 20-30% of the horses on a farm will shed 80% of the eggs present on the pasture.

Those horses with a higher innate resistance to parasites will remain more resistant their whole lives and, therefore, remain ‘low shedders’. This becomes an important feature of a de-worming program. See the general guidelines on the next page.

The worms' pathway to drug resistance



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The scary part of resistance is there are no new de-worming drugs expected to come onto the market for at least the next decade.

Pasture management

- For any worming program to be effective long-term, pasture management is critical. Regular (daily recommended) removal of manure from the pasture is more helpful in controlling worms than drenching. Manure removal prevents larvae present in the manure from spreading onto the pasture. Larvae migrate one metre around each pile of manure, so you can see how easily they can cover the entire pasture.
- Avoid overstocking and overgrazing.
- Feed hay off the ground (e.g. on clean rubber mats) or in feed bins.
- Do not spread non-composted manure on pasture. This just allows the parasites to cover more ground and increases the level of parasite contamination. Parasite eggs and larvae can survive freezing and hot, dry conditions. For instance, strongyle larvae need to be in temperatures over 40°C for two weeks to be eradicated.
- Consider cross-grazing the pasture with cattle and sheep. Parasites do not spread between these species and they will remove larvae infectious to horses from the pasture.
- Do not drench and move horses to a new pasture immediately. Wait at least a week to move onto 'clean' pasture. Moving immediately prevents the critical step of developing a refugia and promotes survival of only resistant worms.
- Pasture rested without any horses for nine months should be 'free' of parasites.
- Small strongyle larvae can survive on pasture in appropriate, cooler climates for six to nine months.

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Only drenching adult horses with high worm burdens (greater than 200 eggs per gram of manure) is currently the best method for parasite management.

Faecal egg counts (FEC's)

The new approach, recommended by veterinary associations worldwide, is to perform Faecal Egg Counts (Worm Tests) before every drenching (every three months). Clearly, this is not always practical or financially feasible, so choosing the horses most at-risk (older, younger or sick) or more valuable, and testing these regularly may be a better option for most horse owners.

Only drenching those adult horses with high worm burdens (greater than 200 eggs per gram of manure) is currently the best method for parasite management.

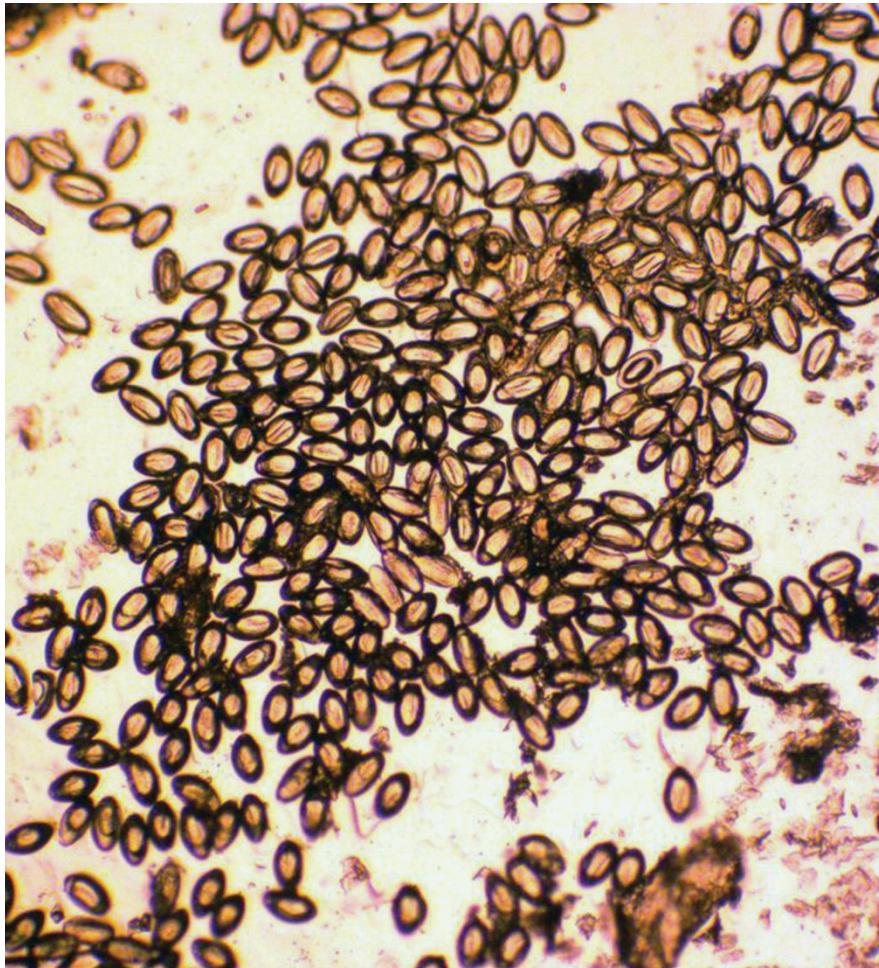
If the test comes back with a low worm count, the drenching interval can be extended to every six months. Once a year, a blood sample should be collected to check for tapeworms and, again, only horses with a high result should be treated.

All new horses coming onto a property should have manure sent for a faecal egg count and be drenched accordingly before being allowed out with the new herd.

Even when a horse has consistently low faecal egg counts, once a year they should be de-wormed with a moxidectin/praziquantel mix to treat for cyathostomes and tapeworms. The best time to do this is in Autumn (April-May).

Ensure not to under-dose horses when drenching - use scales or estimate the weight using a tape measure to determine the appropriate dose. Ensure the entire dose is consumed and don't give the drench if the horse's mouth is full of feed, because it's easier for them to spit it out!

But all of this begs the question...



Above: Pinworm (*Oxyuris*) eggs. Image courtesy of the University of Queensland.

This month's contributor to the health feature from

Equine Dental Vets

Dr Natasha Hovanessian, BVSc, MS

Natasha graduated from the University of Sydney in 2007, completed an internship at Goulburn Valley Equine Hospital in Victoria, and has spent three years in the USA for her Residency in Large Animal Internal Medicine and Master's Degree at the Virginia-Maryland Regional College of Veterinary Medicine. There she did specialist training in Equine Internal Medicine and research into anti-inflammatories for foals. Currently, she enjoys working with Canberra Equine Hospital.



Which drench do I use?

If reasonable pasture management is maintained, drenching horses no more than every three months (four times annually) should be adequate for worm control.

Ideally, which drench to use is decided based on the results of a faecal egg count.

If you are not performing a faecal egg count, then use a drench containing only Ivermectin, Abermectin, Fenbendazole or Oxfenbendazole. Avoid drenches containing more than one product, unless you are specifically treating for tapeworms as well.

The only de-wormers effective against encysted small strongyles are a standard dose of Moxidectin (e.g. Equest) and a five-day double dose course of Fenbendazole (e.g. Panacur). These should only be used in the Spring and Autumn (once or twice annually), or after a high level of small strongyles that have not responded to previous treatments with drenches. If these drugs continue to be overused, we will have NO effective drugs to treat small strongyles on the market for at least the next decade.

The only dewormers effective against tapeworms are a double dose of Pyrantel (e.g. Strongid) and standard dose of Praziquantel (found in combination drenches). Treatment for tapeworm is usually only required in adult horses once per year in late Autumn or Winter, due to the lifecycle of the parasite.

For treatment of bots, it is recommended to drench once a year in late Autumn or early Winter with an Ivermectin or Moxidectin product. Removing the bot eggs from the haircoat will also significantly reduce infection.

None of the alternative, 'natural' remedies have been proven effective in controlling parasites in horses and are not recommended for parasite control.

Foals, weanlings and yearlings

Targeted treatment based on faecal egg counts is not recommended for foals, weanlings and yearlings.

During the first year of life, foals should receive a minimum of four drenches, starting at two-three months of age with Fenbendazole or Oxfenbendazole to treat for ascarids (roundworms).

A second drench is recommended just before weaning at six months of age.

A faecal egg count is recommended at this point to determine whether ascarids or strongyles need to be targeted, and the next doses at nine and 12 months should be based off these results.

Tapeworm treatment should be included at the nine-month drench.

Recently weaned foals should be turned out onto the 'cleanest' pasture with the lowest parasite burdens.

Yearlings and two-year olds should be considered as 'high-shedders', and treated three-four times yearly.

Summary

Although there is no perfect way to control intestinal parasites in horses, the informed horse owner can reduce the likelihood of problems, and the long-term costs, by less frequent drenching and closer monitoring with regular faecal egg counts.



About Faecal Egg Counts

Worm eggs can only be seen through a microscope. A simple test will give you an immediate answer on whether you need to drench or not, or if the drench you just used has been effective.

There are several options available for testing and you should first ask your veterinarian if they offer the service.

Alternatively, you can collect your own sample and choose one of the testing labs that offers FEC's to horse owners.

- NSW DPI - 1800 675 623 - www.dpi.nsw.gov.au/aboutus/services/das/veterinary/wormtest
- STOCK WATCH - 0488 089 676 - www.stockwatchlab.com.au/horses/
- PARA-SITE DIAGNOSTICS - (03) 5766 4374 - www.parasite.com.au
- WORM COUNT - Email john@wormcount.com.au to order a horse test kit and current price list.



The labs will provide detailed instructions on how to collect, label, mail the samples, and complete the forms, as well as the different types of tests they have available. Many of them mail out a kit for sample collection and invoice when the tests have been completed. None of the labs offer veterinary advice though, so involve your veterinarian if you have any doubts or want to clarify the results.

Test prices vary depending on the number of samples submitted with each order, as the labs offer bulk prices for testing several animals in a herd and also depending on the type of test required, but can be as little as \$5 per horse - cheaper than a worming paste! Shop around and find out the different services they provide.

Regular testing will be cheaper than worming a whole mob of horses unnecessarily or with a product that doesn't even work. It is important to stop over-drenching as it is leading to increasing drug resistant worms. You can use lab testing to test for worm burden before drenching or you may want to check for drench resistance by also testing 10-14 days after drenching to see if the product you are using is effective or it is time to rotate.