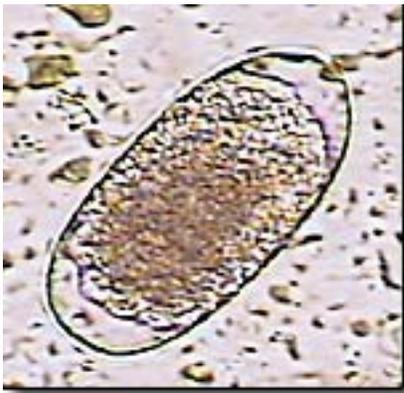


# Managing Resistant Parasites in Horses

## Understanding the basics of parasite resistance and developing a deworming program



Parasite control is an important component of all equine health care programs. It is no longer enough to simply pull out a tube of dewormer and treat your horses every eight weeks. Today it is critically important to understand the basics of parasite resistance and develop a deworming program that will work for your farm. That program will need to be re-evaluated and modified as environmental conditions change from year to year, and farm management and number of horses fluctuate. It is imperative that all horse owners begin to combat resistant parasites that can spread from farm to farm, causing alarming consequences for the equine community.

## Resistance is a real threat!

With no new products on the horizon, it is important to protect our horses by keeping current products effective. Resistance is defined as the ability of parasitic worms in a population to survive a treatment that was once effective against the worms.

Today most horse owners continue to follow recommendations that are 30 to 40 years old and may be using products that are totally ineffective. The ground work for resistance was already in place in the late 1960's when new deworming products were introduced along with the recommendations that horse owners use them every 8 weeks. Prior to the introduction of these products, the large strongyle ( *Strongylus vulgaris* ) was the parasite of greatest concern. These large parasites migrated through arteries, interrupting blood supply to the gut, causing colic and sometimes death. However the use of the drugs of the 1960s and newer products of the 70's and 80's greatly

reduced the prevalence of large strongyles on farms. Unfortunately, indiscriminate use of these products has led to a drastic increase of another parasite, the small strongyle (cyathostomes). By the 1980s it was recognized that virtually 100% of the eggs being shed by horses were small strongyle eggs.

## Small strongyle larvae

- Are very small, virtually microscopic in size.
- Over 100,000 small strongyle larvae can live in a horse resulting in the production of millions of eggs.
- Hundreds can live in a droplet of water on a blade of grass.
- Populations of these parasites on farms can be very large - billions of larvae can occur in pastures.
- Because of their rapid reproductive rate and ability to produce massive numbers of eggs, it is very easy for resistant worms to develop quite quickly. The more frequently deworming products are used, the quicker the resistant parasite levels will build.
- Normally there are very few resistant worms on a farm. Each time deworming products are used, the worms that are susceptible to the product are killed. Only the resistant worms survive and pass on genes for resistance. Horses graze and pick up resistant larvae and then shed more resistant worm eggs. Over time the whole population on the farm is resistant.

## Old Methods of deworming is not working

- What should you do? Work with your veterinarian to develop a program that works for your farm, at the same time reducing reliance on deworming products that can lead to resistant parasites.
- To develop an effective program it is necessary to understand the parasites that you want to control - in other words, it is necessary to think like a parasite.

## If you are a parasite...

- Parasite's number one goal is to produce thousands of eggs.



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- Relatively speaking, very few parasites are actually in the horse. The vast majority of worms are on the pastures.
- The goal of a deworming program should not be to just kill parasites in the horse.
- The major goal should be to reduce shedding of eggs on pastures where they can contaminate many horses. It is especially important to prevent shedding of eggs on early spring pastures to reduce the potential for season long increases in parasite burden.
- Parasites are found in greatest numbers in horses that have poor immunity to them. Most horses have some level of immunity to small strongyles and shed very few eggs.
- It is estimated that 20 to 30% of the horses on farms produce 80% of the eggs. It is important to conduct fecal egg counts to determine which horses carry large parasite burdens and develop a management plan that prevents them from shedding eggs on pastures.
- Parasites have developed strategies to survive adverse conditions in the environment. Warm, wet conditions are necessary for the development of larvae that can infect horses.
- Hot, dry conditions were previously thought to be the enemy of parasites. However, research conducted by Dr. Michael Sukhdeo of Rutgers University, has shown that small strongyles can actually survive very hot dry conditions by "dehydrating." This process is called anhydrosis. In this state the worms are brittle, use very little energy, and can survive long periods in the pasture. They cannot infect a horse in the dehydrated stage but will rehydrate when rain returns. When a drought is broken, large numbers of infectious stage parasites may become present in pastures. Dragging pastures in summer will just serve to spread these dehydrated parasites.
- Parasites can survive in the infectious stage at temperatures of 45 to 85 degrees. Eggs can hatch and develop into infectious stage larvae in 3-5 days at temperatures in the upper 70's when moisture is adequate. At cooler temperatures, this may take weeks or months.
- Parasites want the manure to be deposited in a pasture containing grasses (and a lot of horses.) Stalls and stress lots are generally too dry to support the development of small strongyle larvae that can infect horses.
- Parasites like certain areas of a pasture where they will most likely be found. Horses tend to produce manure as a group in areas of a pasture called "roughs." Horses do not graze the "roughs" in the pastures. They will graze pasture grasses around the roughs creating "lawns" in the pasture.
- Small strongyle eggs are deposited in the manure in the pasture "roughs" and will develop into larvae under the right conditions. The larvae are very small and do not have the energy to move very far from the roughs. However, rain can move parasites downhill from the roughs where they were deposited. The parasites will usually be found below the manure deposition sites, in the lower parts of the pastures. This area usually has the highest soil fertility, the most soil moisture, and the best grass. Interestingly, this is also where the horses most often graze. If you were a parasite you would like that!
- Parasites need to be eaten fairly quickly once they are in the infectious stage. Parasites will be found in a droplet of water on a blade of grass and will be very still to conserve energy. If no horse eats them when in the infectious stage, they die. Rotating pastures can help reduce parasite burdens on pastures. If parasites are eaten by another type of animal they will also die. Multi-species grazing can help with parasite control.
- Parasite populations is strengthened if the horse owner use dewormers frequently. Parasite family members with resistant genes will survive while all parasite relatives without these genes will die. Pretty soon only larvae from eggs from resistant relatives will be infecting horses.
- Proper protocol today calls for maintaining a population of parasites that can be killed by dewormers (a refuge) in order to delay the development of resistant parasites. Fecal egg counts conducted before and after using a deworming product can be used to determine if the parasites on your farm are resistant to that product.
- Parasites appreciate help in being spread throughout the pasture. Harrowing the pasture and spreading fresh manure **will increase the areas of the pasture that have infectious larvae**. Harrowing pastures in summer will just serve to spread dehydrated larvae.
- Removing manure from pastures will virtually reduce the chance of parasite infection. Always be sure to properly compost manure before spreading it on pastures. The heat of composting will destroy many small strongyle eggs.

## Goal of a parasite control program

- Parasites have evolved over millions of years to be very good at what they do. The goal of a parasite control program today is not to eliminate parasites, but to reduce transmission, maintain worm burdens below harmful levels, and manage those horses that maintain chronically high parasite levels.
- To do this **it is critical** to involve your veterinarian in management decisions, use fecal egg counts to determine what the parasite levels are in your horses and on your farm, and make decisions base on environmental conditions, pasture management practices and parasite levels on the farm.

**Thinking like a parasite will help you deal with them!**

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