

Parasite Control

Almost half a century ago a class of anthelmintics, or dewormers, called benzimidazoles revolutionized horse care. With a powerful new weapon to fight parasites, horse owners across the country adopted a parasite control schedule that saw horses receive anthelmintics every eight weeks. Deadly parasitic infections became uncommon, and horse health and performance improved.

Today the world of parasites is a very different battlefield. These crafty freeloaders have fought back from the chemical onslaught, and researchers now report high levels of parasite resistance to benzimidazoles and some other types of dewormers. Despite this evolution most horse owners continue to base their parasite control program on recommendations last laid out when Secretariat won the Triple Crown.

“The vast majority of farms are still locked into antiquated programs that use a blind rotation based on the calendar,” said Dr. Ray Kaplan, a veterinary parasitologist and professor of infectious diseases at the University of Georgia veterinary college. “The reason people continue treating parasites this way is because it’s easy and convenient, but that has to change,” he added.

Know your enemy

Before any deworming program is implemented, it’s important to know a little bit about the parasites that affect horses. The most common parasites that cause problems in horses are large strongyles (also known as blood worms), small strongyles,

ascarids (also known as roundworms), pinworms, and tapeworms, according to Dr. Craig Reinemeyer, a veterinarian, parasitologist, and president of East Tennessee Clinical Research.

In the past large strongyles posed the greatest threat to horse health, with researchers estimating that this parasite caused 90% of colics. However, large strongyles are extremely susceptible to all modern dewormers, and since the introduction of these drugs in the 1960s and 1970s, this parasite has posed very little threat to a horse that is on any kind of deworming program.

“Large strongyles have practically disappeared over the past few decades,” said Kaplan.

Today small strongyles are the most prevalent parasite found in horses that are properly cared for because they have developed resistance to two of the three classes of drugs that can kill them. Luckily, small strongyles are not that pathogenic, according to Reinemeyer, although in rare cases, horses with heavy infections can have chronic diarrhea and weight loss that can be potentially deadly.

Veterinarians can detect the presence of both large and small strongyles through fecal flotation. In this test veterinarians collect a manure sample and mix the feces in a solution that makes the worm eggs float to the top, where they can be observed with a microscope.

Ascarids, which can also be detected through fecal flotation, are more of a worry in young horses, as equines develop immunity to this parasite as they age. “By the time a horse is a year



Broad-spectrum anthelmintics have been effective controls for many common parasites

and a half old, they've seen this parasite, gotten rid of it on their own, or with the help of some chemicals, and for the most part, they never get them again," said Reinemeyer. Typical symptoms of an ascarid infection include diarrhea, colic, and coughing, as this parasite migrates through the lungs. It can even cause pneumonia.

Most owners know that a rubbed tail is a telltale sign of a pinworm infection. Unlike most other parasites, which take up residence in the upper parts of the gastrointestinal tract, the pinworm resides in the last part, right near the rectum, with females laying their eggs on the skin around the anus. Reinemeyer said that these worms aren't particularly dangerous but can be very irritating for the horse and for owners who care about the aesthetics of their horse's tail.

A fecal examination is unlikely to detect pinworms as the eggs aren't shed through manure, as is the case with small and large strongyles, and intermittently flake off the skin around the anus. Instead, Reinemeyer uses a "Scotch tape" test to detect the presence of pinworms. In the Scotch tape test, a veterinarian literally takes a piece of Scotch tape, sticks it to the horse's perianal skin, peels it off, transfers it to a microscope slide, and puts it under a microscope to look for pinworm eggs. Another technique is to take a tongue depressor, dip it in some lubricant and scrape debris from around the anus to examine under a microscope for eggs.

Out of all these parasites, tapeworms are perhaps the most difficult to detect. This may be because their eggs are released in packets and, therefore, are not distributed uniformly throughout the feces. One option for detection is a blood test that will check for tapeworm antibodies in the horse's blood; however, horses that have been exposed in the past, but are not currently infected, can test positive. Although horses often can be infected with tapeworms and show none of the traditional "wormy" symptoms (dull coat, pot belly), tapeworms can irritate the gastrointestinal tract and cause bouts of colic.

"They have the potential to cause trouble, but most of the time, they probably don't," said Reinemeyer.

Treatments and resistance

With the exception of tapeworms, all of the above parasites are controlled with broad-spectrum anthelmintics. There are three classes of broad spectrum drugs for this purpose: benzimidazoles (fenbendazole, oxbendazole) tetrahydropyrimidines (pyrantel products), and macrocyclic lactones (ivermectin, moxidectin). Tapeworms are treated with a double dose of pyrantel, or praziquantel, which currently is not sold on its own but rather added to one of the macrocyclic lactone dewormers (an example is Quest Plus).

It used to be that a veterinarian played an active role in parasite control programs because a vet had to administer anthelmintics through a nasogastric tube. However, the development of new, powerful drugs moved deworming from a veterinary practice to one that could be performed easily and cheaply by

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“The horse industry has locked veterinarians out of the parasite control discussion on economic grounds,” said Kaplan.

“Pharmaceutical companies were advocating simplistic rotations, so there was no place for the veterinarian necessarily. For a long time, the only time veterinarians were involved was when there was a total breakdown in parasite control and they

would come out to deal with the aftermath.”

The prevalence of this simplistic approach to parasite control is what has encouraged resistance to these drugs, according to Kaplan. This is because the susceptible parasites were killed off, which created an environment where the resistant bugs had no competition and were allowed to flourish and pass on those resistant genes to future generations of parasites.

Between 2001 and 2002 Kaplan and colleagues studied small strongyle resistance to anthelmintics on farms in Georgia, South Carolina, Florida, Kentucky, and Louisiana. They found that 97.7% of the farms they studied had strains of small strongyles resistant to fenbendazole, and 53.5% of farms had strains resistant to oxibendazole. Another 40.5% of farms had small strongyles that were resistant to pyrantel pamoate. Their research found no demonstrated resistance to ivermectin; however, in other parts of the world, including England and Brazil, researchers have reported some evidence of small strongyle resistance to ivermectin.

Interestingly, the farms in Kentucky had small strongyles that were the most resistant to the anthelmintics.

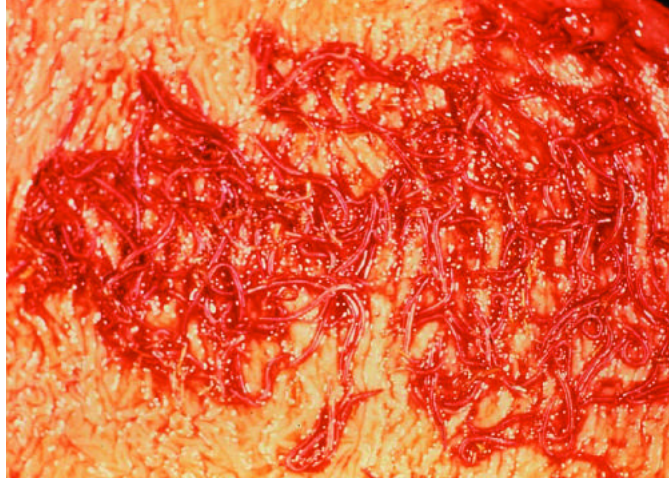
“This is most certainly due to the more intense management of horses in Kentucky, along with the more frequent deworming of herds,” said Kaplan.

In the last few years there have been several reports of ascarid resistance to the macrocyclic lactone class of drugs, including ivermectin and moxidectin. Dr. Reinemeyer attributed this resistance to the excessive use of these dewormers in foals.

“Many breeding farms start foals on dewormers when they are just a few weeks old and often treat them at monthly intervals for the first year of life. This is a textbook recipe for developing resistance, and we should have been expecting ascarid resistance long before it arrived,” he said.

Reinemeyer adds that pinworms appear to be changing as well because “we’re seeing pinworms a lot more in mature horses than we used to. Practitioners commonly tell us that they’ve treated horses every few weeks with double or triple doses of common anthelmintics and still see signs of pinworm infection.”

However, tests recently completed by Reinemeyer’s team did not find any resistance in pinworms.



COURTESY DR. WENDY VAALA/INTERVET-SCHERING PLOUGH ANIMAL HEALTH

Before the use of modern dewormers, large strongyles caused the most problems in horses

“We found that ivermectin and pyrantel pamoate worked just fine, but that doesn’t necessarily exclude the possibility that some farms out there may have resistant strains,” he said.

With small strongyles having a high level of resistance to two of the three drug classes, and some researchers reporting the beginning signs of small strongyle resistance to macrocyclic lactones, the time to address the problem is now, said Kaplan.

“We have to manage our drugs better. It’s only luck that those drugs have lasted as long as they have because resistance can develop fairly quickly,” he added.

A new attack plan

Growing resistance to our arsenal of anthelmintics means we need to rethink our approach to parasite management.

“There is an irrational fear of parasites among the horse community,” said Kaplan. “For the most part, the common parasites of adult horses are not very pathogenic. There needs to be a whole re-education of attitudes toward parasites and how to control them.”

In fact, Kaplan said that growing parasitic resistance is the cause of most of the parasitic disease that he sees.

“It is true that parasitic disease in adult horses is now very rare, but every case that I have seen that was not due to neglect was due to treating with drugs that did not work, enabling parasites to build up to levels that could cause disease,” he said.

In the past, owners implemented parasite control programs with the aim of eradicating the worms. However, this isn’t a realistic goal and can actually hinder the fight against parasites.

“All grazing animals evolved with parasites, so parasites are a natural part of a horse’s intestinal flora. Our goal is to prevent the levels from getting so high that they pose a disease issue,” said Kaplan.

Although it sounds counterintuitive, the best deworming program is one that ensures some of the parasites are left untreated. These surviving parasites, called refugia, provide a surviving pool of genes that

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are susceptible to anthelmintics, according to Kaplan. This ensures resistant strains don't overtake parasite populations.

Maintaining refugia at your farm means that you must perform fecal floats to determine which horses actually need deworming treatments. According to Kaplan some horses are naturally more immune to parasites than others, so the horses can be divided into three categories based on a single fecal egg count: high contaminators, low contaminators, and moderate contaminators.

High contaminators will make up about 20% to 30% of your herd and will have more than 500 eggs per gram (EPG) of manure. Low contaminators will make up 30% to 50% of your herd and will have an EPG count less than 200. Moderate contaminators are the remaining group and have EPG counts between 200 and 500.

Once you have grouped your herd into high, moderate, and low egg shedders, you can develop a deworming strategy with your veterinarian that involves rotating through any classes of dewormers that remain effective on your farm. In order to determine the efficacy of the drugs, you will have to perform another fecal egg count test two weeks after treatment with each. This is the only way to determine whether you have resistant strains of parasites on your farm, according to Kaplan.

Also, instead of deworming cycles being based around eight week increments, treatments should now be based around the seasons. According to Reinemeyer, new potential parasites can hatch and develop in temperatures between 45 and 85F. Reinemeyer noted that parasite eggs are like plant seeds: They need moderate temperatures and moisture in order to germinate and grow, so spring and autumn generally translate into high transmission seasons in all geographic locales. Due to climatic effects the typical strongyle transmission season in the southern U.S. extends from autumn through winter and into spring, whereas in the north, it begins in spring

and ends in autumn. Infective stages in the environment can survive prolonged freezing, however, so northern pastures do represent a potential source of infection during winter.

Management

As mentioned before, the presence of parasites in the horse is a natural state and in the wild, parasites rarely cause problems for horses.

"Parasitism is not so much an organic disease as it is a management disease," said Reinemeyer. "I don't think very many horses a million years ago died of

study performed by Dr. Rupert Herd, a veterinary parasitologist, which demonstrated that frequent removal of manure from pastures was more effective at controlling strongyle parasites than deworming. However, the team used a special commercial vacuum designed for cleaning golf courses to suck up the manure.

While the same remarkable results might not be achieved with manual removal, getting out in the pastures and picking up manure twice a week can still put a huge dent in the worm population.

"It's something that people can feasibly do, and it will go a long way toward helping to control parasites without the use of chemicals," said Reinemeyer.

On the flip side, the common practice of running a harrow through a pasture to break up manure can make matters worse. Reinemeyer advised against this practice because it spreads parasite eggs evenly throughout the pasture, whereas if left alone, horses will avoid areas where they defecate, which can have 15 times the amount of parasite eggs as cleaner areas.

If you must harrow, Reinemeyer recommends doing so only in the hottest and driest months of the year and keeping the horses off that section of pasture for a week or two to ensure the eggs have died.

Take home message

In the 1960s, the development of anthelmintics revolutionized horse care. Unfortunately, most horse owners are still stuck in a decades-old approach to parasite control that demands a standard treatment

every eight weeks. The recurring genetic pressure of this antiquated treatment plan has promoted anthelmintic resistance. Because parasites have risen to the challenge of the traditional approach to deworming, owners must adopt a new attack plan. A successful, modern parasite control plan relies on good management practices, followed by a treatment plan in which owners sparingly use anthelmintics known to be effective and base treatments on fecal floats, not on the calendar. 🐾



A more modern approach to deworming is needed to combat the growing resistance of parasites

parasites. Parasites didn't become a problem until the first caveman decided to throw a fence around a horse."

Of course, any knowledgeable horse person is aware that overloading pastures and having a lackadaisical approach to manure removal will contribute to a farm's parasite problems; however, horse owners are often unaware of how effective a good pasture and stable management program can be at preventing parasites.

Reinemeyer pointed to a 25-year-old

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