



Controlling Common Internal Parasites of the Horse

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Internal parasites continue to be a significant threat to the health of horses. Internal parasites are small organisms that live a portion of their life cycle in a host animal. They live in internal organs, body cavities, and tissues and gain their nutritive source by feeding on the host animal. The horse is affected by many different species of parasites. The nature and extent of damage varies with the parasite.

Parasite infestation causes loss of nutrients or blood from the host and serious economical and medical problems in managing horses. While it is obviously expensive to feed parasite burdened horses, depletion of nutrients and blood can cause severe loss of condition, decrease growth, and reduce reproductive and athletic performance.

There are numerous internal parasites that can infect a horse, but only a few that commonly cause significant health problems. It is important to understand the life cycle of these parasites. Successful prevention and control programs are effective because they interrupt the life cycle of parasites. The primary class of internal parasites that cause health problems for horses are nematodes such as large and small strongyles, ascarids, and tapeworms in some areas of the country. Other internal parasites perhaps of lesser significance, such as pinworms and botfly larvae, are often considered when designing a parasite control program.

Common Internal Parasites

Strongyles

Strongyles are grouped as either large or small. The three primary species of large strongyles that infect the horse are *Strongylus vulgaris*, *Strongylus endentatus*, and *Strongylus equinus*.

The adult form of all strongyles (large or small) live in the large intestine. Adult strongyles produce ova that are passed out into the feces, thus contaminating the environment. These eggs then develop into infective larvae that exist on the pasture vegetation. Consuming grass, feed, or water contaminated with infective larvae infects the horse. These larvae are very resistant to harsh environmental conditions because of a protective sheath. These parasites can survive freezing weather, but a hot and dry environment will often kill them. The infective larvae survive up to 31 weeks at winter temperatures, compared to up to seven weeks at summer temperatures.

The larvae of large strongyles migrate through various parts of the body. *Strongylus vulgaris*, the bloodworm, will burrow into and migrate in the walls of the arteries that are the primary blood supply to the small and large intestines. This migration can result in disruption of blood flow to the intestines by the formation of blood clots. After approximately 120 days, the larvae move to the lumen of the large intestine where maturation is completed. As adults, these parasites will lay several thousand eggs each day completing the life cycle. The entire life cycle takes six to seven months.

The other two large strongyles (*Strongylus endentatus* and *Strongylus equinus*) have similar life cycles except their larval migration is primarily through the liver. This migration results in damage to this organ, but it is not as dangerous as the *S. vulgaris* migration through the intestinal blood supply. *S. endentatus* and *S. equinus* larvae also return to the large intestines where they mature into adults but their life cycle is approximately eight to eleven months.

The use of effective anthelmintic (antiparasitic) compounds has reduced the prevalence of large strongyles which has been a parasite that caused the most damage to horses. Today, because of the reduction to near elimination of clinical diseases caused by the large strongyle, the small strongyle is considered to be the most common parasite of horses. Severely infected horses may exhibit clinical signs such as sudden onset of diarrhea and colic. But horses can be infected with small strongyles and show no overt signs of disease. Small strongyles have been implicated to cause subclinical effects such as decreased feed efficiency, rate of gain, and performance.

The life cycle of the small strongyle (cyathostomes) is very similar to large strongyles except the larvae do not migrate beyond the wall of the intestines. The larva burrow in or encyst in the wall of the large bowel. The clinical signs, such as diarrhea, and the negative impact on growth performance are primarily caused when large numbers of the encysted cyathostomes emerge from the gut wall resulting in inflammation. The severity of clinical signs is related to the degree of damage to the intestines which varies with the level of infection. At this time, it is unclear why the cyathostomes tend to emerge all at once. The occurrence of larval cyathostomosis may be associated with the following factors: 1) season (winter/spring in northern areas, spring/summer in southern areas), 2) antiparasitic treatment within two weeks, and 3) young horses (less than six years).

Ascarid (Roundworm)

Parascaris equorum, the horse roundworm, is a very large (females may be up to 15 inches long), yellowish white parasite that may pass out in the feces of foals and young horses. Typically, adult horses develop an immunity to this parasite; therefore, roundworms primarily infect young horses less than two years of age. The life cycle of the roundworm starts when the susceptible horse consumes grass, feed, or water contaminated with the infective eggs. The eggs hatch larvae that burrow into the small intestines migrating through veins to the liver, heart, and eventually the lungs. After migrating in the air spaces of the lungs, the parasite larvae are coughed up and swallowed. The roundworm larvae are returned to the small intestine where they mature to egg producing adults, completing the life cycle. The life cycle takes about three months. Physical damage such as inflammation and scarring of liver and lung tissue occur in the horse during migration. Adult roundworms can cause physical damage, ranging from mild digestive upset and lower feed absorption, to severe colic, due to intestinal blockage or intestinal rupture. Clinical signs of roundworm infection may include unthriftiness, potbelly, rough haircoat, and slow growth. Some young horses develop nasal discharge accompanied by a cough as a result of larvae migration.

Strongyloides (Threadworm)

Strongyloides westeri is an intestinal parasite that can infect foals as early as four days of age. A foal becomes infected by ingestion of larvae in the dam's milk or by penetration of the foal's skin by infected larvae in the bedding. However, the larvae are not present in colostrum. The larvae migrate through the lungs and the small intestine. The life cycle can be completed in less than two weeks. This creates the potential for severe infestations in a relatively short time. Foals will quickly develop immunity to these parasites and lose the intestinal infection of adult parasites by 60 to 90 days of age. The primary medical problem a strongyloides infection may cause is diarrhea that may not respond to treatment. Some foals will become dehydrated and develop other problems related to chronic diarrhea. Treatment of mares with an anthelmintic effective against strongyloides within 24 hours of birth significantly reduces transmission of this parasite to foals.

Stomach Bots

Stomach bots are not worms, but rather the larvae of the botfly *Gasterophilus*. Female botflies lay their eggs by attaching them to the hairs of the horse. Different species lay their eggs on different parts of the horse's body (legs, jaw, lips, etc.). The eggs on the legs are stimulated to hatch by the lip action and warm saliva as the horse licks its leg. Those seen around the nostrils and lips hatch in one to one and a half weeks spontaneously. Larvae attach and burrow into the tongue and gums of the mouth and incubate there for three weeks. After incubation, they are swallowed and attach to the lining of the stomach. Bots spend approximately nine months attached to the stomach lining before passing out with the manure. These larvae pupate into adult flies. The life cycle depends on the parasite larvae overwintering in the stomach, then passing out in the manure in spring and subsequently developing into adult flies.

The adult flies are active from late spring to the killing frost in the late fall. Botfly larvae probably cause minimal damage to the stomach, but may cause problems such as outflow obstruction or damage to lining of stomach. However, until these parasites are proven not to cause damage, their control should be considered in any parasite control program.

Other Species

Other species of internal parasites that may cause problems for horses include lungworms, pinworms (which cause tail rubbing), and tapeworms. Most of these species do not create as serious a health problem because of their lower incidence of infestation or their life cycle is not as harmful to the horse. However on occasion, these parasites can become a problem and your veterinarian can diagnose them and recommend proper treatment.

Prevention and Control

Many variables affect the selection of a specific parasite prevention and control programs. For example, type of environment in which the horse lives (climate, rainfall), age of the horse, stocking rate, and land type. Internal parasite prevention programs can be divided into two basic areas—management and chemical treatment.

Management

Management programs which interrupt the life cycle of the parasite before infestation occurs are the key to successful control. Sanitation in stall areas is essential. Manure should be removed and placed in a compost pile or spread on cropland or pastures not being grazed by horses. The larvae in composted manure will be destroyed if sufficient heat is built up. Spreading manure by dragging pastures will decrease incidence of infective larvae if the climate allows for drying of manure.

Alternative grazing with ruminants and pasture rotation schemes will aid in disrupting the parasite life cycle. Grazing ruminants in rotation with horses will reduce parasite infestation since most internal parasites are host specific. Pasture rotation may also help by decreasing incidence of overgrazing, thus decreasing ingestion of parasites.

Vacuuming or collecting fecal material in pasture is expensive, but it can be very effective. Grouping horses in pastures according to age will help minimize young horses coming in contact with heavy larval infestations. For example, pasture mares and foals away from other horses less than two years of age. Yearling horses often need a different control program than a broodmare. It can be more difficult to control parasites in a herd if all ages and classes of horses are in a pasture together. Be sure to isolate and deworm all new arrivals to the farm. When feeding horses, always provide hay mangers and feed bunks. Feeding horses on the ground and not out of containers increases the risk of becoming infested with parasites. All feeders, buckets, and water troughs should be routinely cleaned to help prevent fecal contamination of feed or water.

Chemical Treatment

Various types of chemicals called antiparasitics or anthelmintics have been developed to eliminate parasites (Table 1). These chemicals work in a number of ways. Some

Table 1. Examples of Equine Anthelmintic Compounds.

Class	Anthelmintic	Mean Efficiency(%) ¹				
		Bots	Ascarids	Strongyles		Pinworms
				Large	Small	
Avermectin	Ivermectin	99	100	100	100	100
Milbemycin	Moxidectin	90	100	100	100	100
Benzimidazole	Fenbendazole	0	85	95-97	97	97
	Oxibendazole	0	85	97	97	97
Pyrimidines	Pyrantel-pamoate	0	95	70-77	95	50
	Pyrantel-tartrate	Prevents infective larvae from entering tissue				

Encysted Small Strongyle Larvae:

Moxidectin — larvicidal efficacy 59 to 92%^{2,3,4}

Benzimidazole class — certain dosage regimens have been reported to be effective.^{2,3,4}

1 Klei, Thomas R., Parasite control programs. *Current therapy in equine medicine* 4, Robinson, Edward N. W.B. Saunders Co., 1997.

2 Scholl, Phillip, Ph.D. Moxidectin 2% equine oral gel. *Equine practice*, Vol. 20, No. 3, March 1998.

3 Abbott, E.M. BVMS, PhD, MRCVS. Larval cyathostomosis, Part 1. *Equine practice*, Vol. 20, No. 3, March 1998.

4 Paul, John W. DVM, MS. Equine larval cyathostomosis, *Parasitology*, Vol. 20, No. 4, April 1998.

paralyze the parasite, thus allowing the host to expel them. Other chemicals prevent nutrient utilization or limit reproductive capabilities in the parasites, thus killing them or stopping the life cycle. A large number of commercial anthelmintic or antiparasitic compounds are currently on the market to remove internal parasites from horses. These antiparasitics are separated into six major classes. The more common classes are avermectins/milbemycins, benzimidazoles, and pyrimidines. These anthelmintics are available in different physical forms (paste, feed additives, gel, drench) and are sold under several trade names. Antiparasitics are effective by all routes given, if an appropriate dose is administered based on the horse's weight, and the entire dose gets into the horse.

Knowledge of antiparasitics is important to a horse owner because these chemicals vary in their ability to remove specific parasites. For example, a compound may be effective at controlling strongyles and ascarids, but not bots or tapeworms, where another chemical is effective in controlling ascarids, strongyles, and tapeworms, but not bots. In addition, some anthelmintics are not safe for certain classes or ages of horses.

A rotational treatment protocol, which is alternating between classes of anthelmintics, is often utilized to avoid resistance to an anthelmintic class. There are several deworming strategies used in equine parasite control and all have advantages and disadvantages. Some of the common strategies are interval treatment, annual rotation, daily (continuous) treatment (also administer a boticide at least twice a year), no rotation, targeted treatment, and strategic treatments. There is no deworming strategy that fits all horses. Factors such as climate, humidity, season, rainfall, stocking rate, age of the horse, and financial resources of the owner all affect the selection of a parasite control program. It is critical to consult a veterinarian to establish an effective parasite control program that will be effective for the horse(s).

In most circumstances, a horse will need to be dewormed several times a year starting at about four to eight weeks of

age. Some anthelmintics are toxic to young foals and the labels and package inserts should be read carefully. Typically, parasite control programs are most effective if treatments are administered at the times when environmental conditions are favorable for hatching of eggs or development of larvae, which is the time when transmission of infection is likely to occur. An essential component to an effective parasite control program is to check the efficacy of that program by evaluating fecal samples for parasite ova on an annual basis. The primary goal of a parasite control program for your horse(s) should be to "maximize health" by utilizing nonchemical managerial strategies and through effective use of antiparasitic compounds.

An Overview of Management

Practices and Deworming

Internal parasite control is a long-term continuous program. Control of internal parasites in the horse is achieved by combining management practices with anthelmintic treatment. A combination of management practices and anthelmintics will give efficient economical results.

Suggested Management Practices:

1. Deworm all foals at four to eight weeks of age. Repeat every 30 to 60 days, depending on the circumstances of the environment.
2. Regular rotation of pastures.
3. Small pastures from one to 10 acres can be divided into smaller areas so horses can be rotated. This will help lower the worm burden as well as give forage a chance to recover.
4. If possible, pasture cattle, sheep, or goats behind the horse(s). These species will consume the infective larvae of the horses' parasites. These larvae will be inactivated.
5. Clean stalls on a regular basis and compost manure or spread thinly over pasture not being grazed by horses.

Stalled horses become reinfested from larvae crawling up the walls and being licked off by the horses.

6. Mowing and harrowing pastures to break up fecal piles during the hottest and driest season of the year will decrease numbers of infective larvae.
7. Feed horses grain and hay from some type of rack or trough. This includes pastured horses.
8. Yearly fecal examination by a veterinarian will evaluate how well the program is working.
9. Avoid overstocking a pasture as this will increase the risk of exposure to infective larvae or eggs.
10. Alternate anthelmintic classes to decrease possible parasite resistance to an anthelmintics class and administer anthelmintic to all horses at the same time that they are kept together.

One should always refer to and follow the label instructions of an anthelmintic when administering it to a horse.

Summary

Internal parasites are a serious health problem. Even under proper management, horses will become infested with internal parasites. It is essential that proper management techniques be combined with proper administration of anthelmintics. Management programs are often more important than chemical treatments. There is no single parasite control program that is effective for all horses in all management or environmental situations.

Consult a local veterinarian because they are the experts on equine internal parasites in the environment in which you live. As animal health experts, they can design an effective parasite control that fits in a total preventive health plan to maximize horse's health.