

# The Practical Guide to Equine Internal Parasites and Dewormers



Dear horse owner:

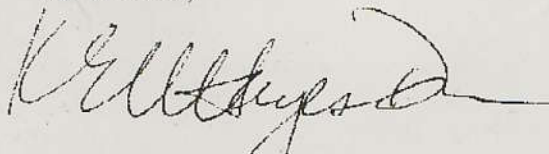
There's a lot of hype and misinformation floating around about the best ways to keep your horse healthy – it can be tough sometimes to know what to believe.

But let there be no doubt that one of the most important things you can do to help your horse live a healthy, vigorous life is to protect him from the ravages of internal parasites – “worms”. These destructive creatures take advantage of the fact that they're mostly hidden from view – out of sight, out of mind. And they thrive in today's environment, where horses spend at least part of the average day exposed to literally millions of parasite eggs and larvae . . . just waiting for you to slack off on your horse's deworming program. The damage they can do is sneaky but can be significant. By the time your horse shows outward signs of a severe parasite infestation, he's already suffered a great deal. That's the bad news.

But the good news is: Parasite damage is entirely and easily preventable, with your choice of straightforward deworming programs using safe, effective products. All you have to do is choose a program that fits your situation, and stick with it.

Do you need a college degree in parasitology so you can choose your horse's deworming program wisely? No. All you need is reliable information, such as what is provided in this brochure. It's plain, nuts-and-bolts talk about the parasites that threaten your horse, and the compounds available to control them, to help you separate the facts from the hype.

All the best,

A handwritten signature in black ink, appearing to read 'K. E. N. Hayes', written in a cursive style.

Karen E. N. Hayes, DVM, MS

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# INTRODUCTION

Parasites have long been a problem for horses and horse owners alike. In the “old days” horses became lame, lost weight, suffered severe colic and even died because of worms. Horse owners tried just about everything imaginable to relieve their horses’ plight of pests, but oftentimes the cure was worse than the disease.

Thankfully, advances in science and sanitation have allowed us to control these nasty – and unfortunately – natural parts of a horse’s life more effectively without inflicting more damage and suffering on your beloved companion.

Large strongyles, horses’ one-time arch enemies, have very nearly disappeared thanks largely to ivermectin. But we must remain vigilant. Large strongyles have not completely disappeared from the planet, they’re simply waiting for us to drop our guard. The best defense is continued diligence.

But with all the products on the market, it’s sometimes very difficult to figure out which are the best for your horse. This booklet was designed to help clear up some of the confusion. In this special report, you will be given full descriptions of each parasite that plague our horses, plus a chart showing exactly which products control that pest. These pages are organized alphabetically by common name of the parasite, but the Latin, scientific, name is also given, so you can understand advertisements and package labeling.

We’ve also included sections on general control of parasites, the classifications of parasites and dewormers and even a little horse anatomy.

Keep this booklet handy when you are evaluating dewormers. It’ll help you better understand what is best for the health of your horse. If you have any questions, ask your veterinarian.

## Types of Parasites

A parasite is any living organism that lives off another living organism – in this case, your horse. Horses play “host” to many different parasites and get nothing good in return for their hospitality.

There are two different kinds of parasites: internal and external. Internal parasites, or endoparasites, live happily within the host’s body.

This booklet focuses on those internal parasites significant to horses and their owners.



# Ascarids or Roundworms (*Parascaris equorum*)



**Scientific name:** *Parascaris equorum*  
**Common name:** Ascarids, Roundworms

**Physical description of parasite:**

Ascarids, or roundworms, are a rigid, heavy-bodied worm. Adults can reach up to 50 cm long (about 20 inches).

**Stages/lifecycle:**

Adult female ascarids lay eggs which are passed in manure to the pasture where they develop into infective larvae in 10 days to six weeks. The horse swallows the larvae, which hatch and burrow into the walls of the intestine. From there, they are carried by the blood stream into the liver and lungs, then move up the horse's wind pipe. The horse coughs up the larvae and swallows them again. They mature to adults in the small intestine.



**How the parasite enters the horse's system:**

The horse swallows ascarid larvae as he grazes on infected grass in the pasture.

**Effects of parasite if left untreated:**

Ascarids are especially dangerous to foals aged 6 months or younger. Severe infection in horses this young can build up quickly and lead to liver and lung damage, poor overall growth and even death.

As the larvae are moving through the blood system, foals can experience coughing, fever, pneumonia, bleeding lungs and other respiratory infections. Ascarids in the adult stage live in the small intestine where they can cause colic, blockage, ruptured gut and death.

Severely infected foals may experience alternating bouts of foul-smelling diarrhea and constipation. Infected foals can lose weight, but may have a pot-bellied appearance. They often have low energy.



## ASCARIDS/ROUNDWORMS: Species & Stages

	<i>Parascaris equorum</i> - Adults	<i>Parascaris equorum</i> - L3 Larvae	<i>Parascaris equorum</i> - L4 Larvae
fenbendazole	***		
ivermectin			
moxidectin			
oxfendazole			
oxibendazole			
pyrantel pamoate			
pyrantel tartrate-daily			
pyrantel tartrate-single			

\*\*\*requires more than single syringe for 1,000 pound horse

Control: See page 18 for product brand names

## Bot flies (*Gastrophilus*)

**Scientific name:** *Gastrophilus intestinalis*,  
*G. nasalis*

**Common name:** Bot flies

### Physical description of parasite:

Adult flies are brown, hairy and bee-like, with one pair of wings, and measure about 3/4". The larva (bot) is also 3/4" long with a narrow, hooked end and a broad, rounded body.

### Stages/lifecycle:

After a three-week developmental period in the mouth, bot fly larvae of both species, *G. intestinalis* and *G. nasalis*, migrate and attach themselves to the mucus lining of the horse's stomach and remain there during the winter. After about 10 months, they detach from the lining and are passed out of the body through the feces. The larvae burrow into the ground and mature. Depending on the conditions, adults emerge in three to 10 weeks. Adult females deposit eggs on the horse's legs, shoulders, chin, and throat and the lips. Depending on geographic location, the life cycle of bot flies is not fixed to only certain times of the year and bot larvae can be active in horses anywhere from August to May.

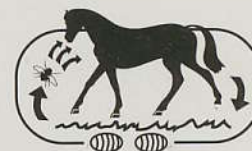
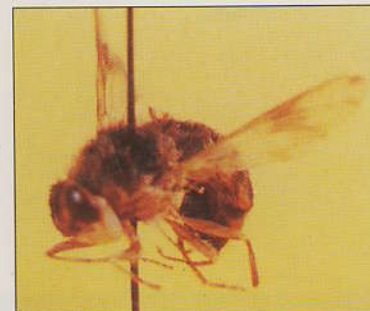
### How the parasite enters the horse's system:

Egg laying begins in early summer. Eggs of the different species differ in color and

placement. *G. intestinalis* lay up to 1,000 pale yellow eggs on the horse's forelegs and shoulders. Moisture and friction from the horse licking itself cause the eggs to hatch in about seven days. *G. nasalis* lays about 500 yellow eggs around the chin and throat of the horse. These eggs are not dependent on the horse licking them to hatch. After hatching, *G. intestinalis* larvae are licked into the mouth. *G. nasalis* burrow under the skin to the mouth, there wandering through the mouth for about a month before migrating to the stomach for overwintering.

### Effects of parasite if left untreated:

Horses that show no outward signs of illness can be severely infested, giving no clue of the potential damage occurring inside. However, some horses do show signs of infestation, including an inflamed mouth area and stomach irritation. Infestation with bot larvae may cause holes in the stomach lining. If the infestation is severe, the opening from the stomach to the intestines may be blocked, which can cause irritation, ulcers and even colic. The burrowing larvae can cause small tears in the skin, which can become infected. "Dive bombing" adult flies cause nervousness in horses.



### BOT FLIES: Species & Stages

	<i>G. intestinalis</i> - 1st instar	<i>G. intestinalis</i> - 2nd instar	<i>G. intestinalis</i> - 3rd instar	<i>G. nasalis</i> - 1st instar	<i>G. nasalis</i> - 2nd instar	<i>G. nasalis</i> - 3rd instar
fenbendazole						
ivermectin						
moxidectin						
oxfendazole						
oxibendazole						
pyrantel pamoate						
pyrantel tartrate-daily						
pyrantel tartrate-single						

Control: See page 18 for product brand names

## Hair Worms (*Trichostrongylus axei*)

**Scientific name:** *Trichostrongylus axei*

**Common name:** Hair worms

**Physical description of parasite:**

The adult worm is tiny (0.5 cm long) and hair-like.

**Stages/lifecycle:**

The adult worm occurs in the stomach and in the small intestine, irritating and eroding the finger-like projections, or villi, of the gut, damaging the capillaries and lymph vessels within the villi.

**How the parasite enters the horse's system:**

The horse eats grasses infected with eggs of the stomach hair worm. The eggs hatch and the larvae move into the stomach where they mature and lay more eggs which are passed in the manure.

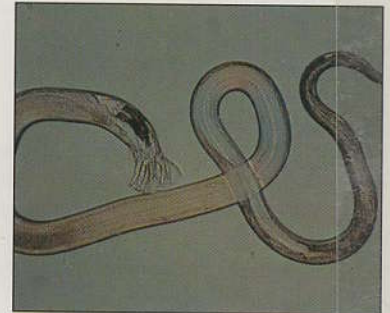
**Effects of parasite if left untreated:**

When a horse is infected with hair worms, he is usually also infected with other worms. Damage caused by the hair worm can be worsened by other worms in the system.

Signs of infection may be dark, foul-smelling diarrhea, because the damaged villi are unable to digest and absorb properly in the intestine.


If there is severe damage to the villi, the underlying small vessels could be damaged as well, causing bleeding into the intestines. Bleeding may lead to anemia and loss of condition.

Foals are very open to infection by hair worms, so broodmares should be dewormed and moved to clean pastures.



### HAIR WORM

	<i>Trichostrongylus axei</i> - adults
fenbendazole	
ivermectin	
moxidectin	
oxfendazole	
oxibendazole	
pyrantel pamoate	
pyrantel tartrate-daily	
pyrantel tartrate-single	

 Control: See page 18 for product brand names



# Intestinal Threadworms (*Strongyloides westeri*)

**Scientific name:** *Strongyloides westeri*  
**Common name:** Intestinal Threadworms

**Physical description of parasite:**

Threadworms are long and hair-like. Adults grow to be 8 to 9 mm in length (about 2/5 inch).

**Stages/lifecycle:**

Larvae mature to adult worms in the small intestine. Infection can occur by eating infective larvae or by penetration through the skin. If the larvae enter the horse's system through its skin, they move to the lungs, then up the wind pipe where they are coughed up and swallowed. They mature in the small intestine, where adult females lay the eggs that are passed out in the manure.

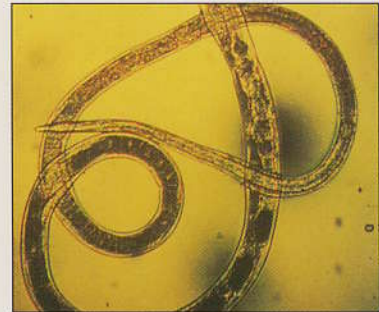
**How the parasite enters the horse's system:**

The infective larvae of the threadworm can either be swallowed by the horse or the larvae can go through the horse's skin. Young foals can also be exposed to the worm by nursing from their infected mothers.

**Effects of parasite if left untreated:**


If the larvae enter through the skin the next stop is the lungs, where they can cause bleeding and respiratory problems. Inflammation, and rashes can develop where the larvae penetrated the skin.

The worst damage occurs in untreated foals. Infected through their mothers' milk, they can suffer diarrhea, weakness, weight loss and failure to thrive and grow at a normal rate. Veterinarians generally recommend deworming your foal early in life and as often as every month until weaning. Diarrhea in 7-10 day old foals may be caused by intestinal threadworms. Deworming may be beneficial in these cases. Be very careful to read your dewormer's label — some products cannot be used on foals this young.



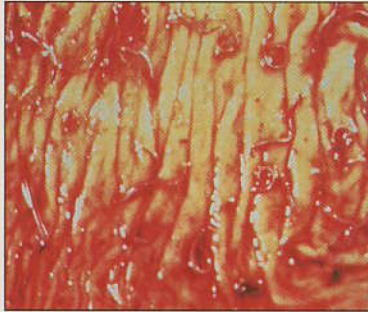
**INTESTINAL THREADWORMS**

	<i>Strongyloides westeri</i> - adults
fenbendazole	
ivermectin	
moxidectin	
oxfendazole	
oxibendazole	
pyrantel pamoate	
pyrantel tartrate	

 Control: See page 18 for product brand names



## Large Strongyles (*Strongylus vulgaris*, *S. equinus*, *S. edentatus*)



**Scientific name:** *Strongylus vulgaris*,  
*S. equinus*, *S. edentatus*

**Common name:** Large Strongyles,  
Bloodworms

### Physical description of parasite:

Large strongyles are long, fat worms with biting mouths. Since they are full of their equine victims' blood, they usually are reddish-brown in color.

### Stages/lifecycle:

Eggs of the three species of large strongyle can develop into infective larvae on pasture in as little as three days if warm, moist conditions exist. Once the larvae have been swallowed, the larvae drop their protective coating, or "sheath", on their bodies and migrate to different organs for further development. The larvae of *Strongylus vulgaris*, the most harmful of the three, move to the horse's arteries where they "go with the flow" of the blood for approximately two weeks. When they reach the mesenteric artery, the main artery that feeds the gut area, they stay there for approximately four months while they continue growing. Then they return to the large intestine through the arteries. Once in the large intestine, the larvae burrow into the intestinal cavity. After six to eight months, the worms are mature and eggs begin to pass into the manure.

*Strongylus equinus* larvae move to the liver after they have shed their protective coating. They stay there for approximately six weeks, then move through various abdominal organs to the large intestine. After about nine months, adult worms lay their eggs.

*Strongylus edentatus* also move to the liver where they remain for approximately nine weeks, then

move to the lining of the abdominal cavity where they form nodules. The larvae also form nodules in the gut wall, which they break open to serve as a doorway into the large intestine.

### How the parasite enters the horse's system:

Large strongyle larvae live in the manure in the grass. When the horse swallows infected grass, the growing process of the worms begins.

### Effects of parasite if left untreated:

Of the three species, *Strongylus vulgaris* does the most damage. That's because this species uses – and damages – the blood system as it moves around the horse's body. During their wanderings, the larvae rough up the walls of the arteries, leaving "tracks" in the lining. These tracks are perfect spots for blood clots. The clots break away from the walls and lodge in other blood vessels, blocking the blood flow to the intestine below the clot.

The rough walls of blood vessels not only promote blood-clot development, but also weaken the walls. If the blood-vessel wall is weakened enough, it can burst, causing immediate death.

If the blood clots block blood flow to the hind quarters, lameness and/or weakness can result.

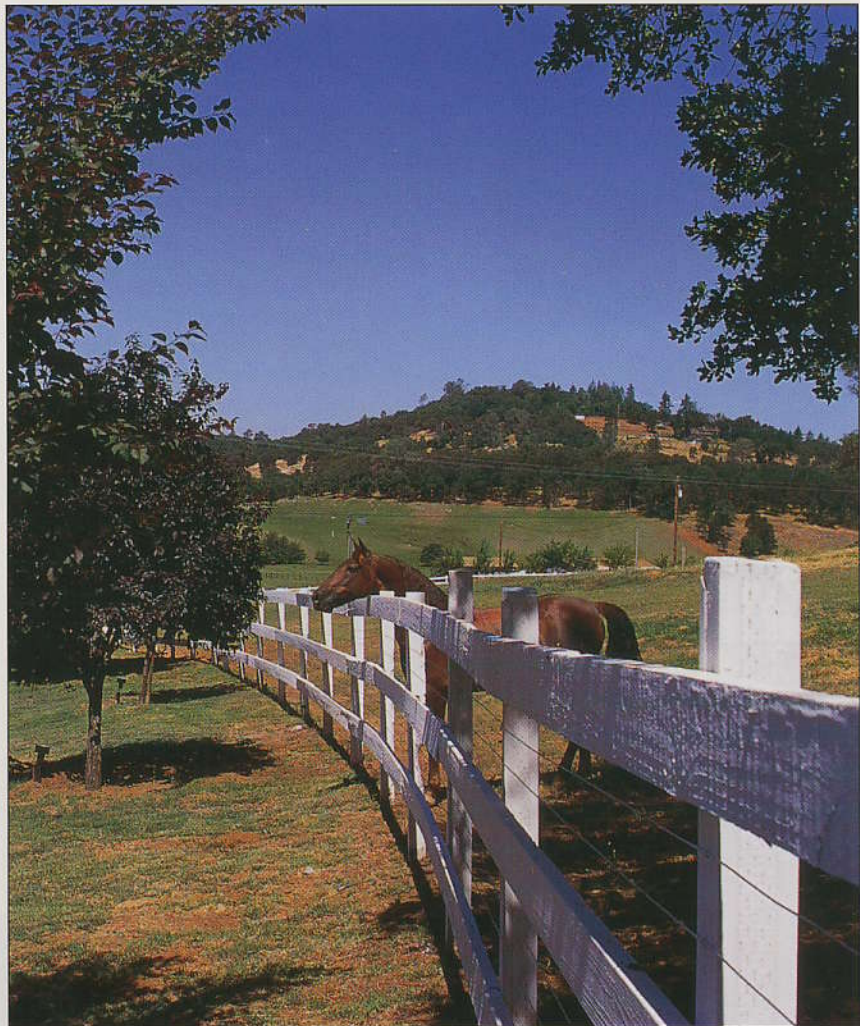
When they set up housekeeping in the large intestine, the worms literally bite off pieces of it. This may lead to severe colic, diarrhea, fever and anemia from the bleeding "bite wounds" in the stomach and intestine.

Large strongyles were once the most common and most dangerous equine parasite. This is no longer



true, thanks to education of horse owners and diligent deworming practices using highly effective dewormers. As long as we continue these good practices, there's every reason to believe that large strongyles will not resume their role as a major cause of colic. But if we let up, they'll be back.

The other two species, *S. equinus* and *S. edentatus*, can cause liver damage.



### LARGE STRONGYLES: Species & Stages

	<i>S. vulgaris</i> - adults	<i>S. vulgaris</i> - L4 arterial	<i>S. vulgaris</i> - L5 arterial	<i>S. edentatus</i> - adults	<i>S. edentatus</i> - tissue	<i>S. equinus</i> - adults
fenbendazole*						
ivermectin						
moxidectin						
oxfendazole*						
oxibendazole*						
pyrantel pamoate						
pyrantel tartrate-daily						
pyrantel tartrate-single						

\*at a single larval dose

Control: See page 18 for product brand names

## Lungworms (*Dictyocaulus arnfieldi*)



**Scientific name:** *Dictyocaulus arnfieldi*

**Common name:** Horse Lungworms

**Physical description of parasite:**

The horse lungworm is long and slender, measuring about 2 inches (25 to 70 mm).

**Stages/lifecycle:**

The larvae go through the walls of the intestine and into the circulatory system. They are carried in the circulatory system into the lungs, where they mature. The eggs pass through the horse's system through the manure.

**How the parasite enters the horse's system:**

Female lungworms lay eggs containing larvae. The horse eats the eggs of the lungworm off damp grasses.

**Effects of parasite if left untreated:**

If there are large numbers of the larvae present, the lining of the small air sacs in the lungs, called the bronchioles, may become irritated causing the horse to have a severe cough, difficulty breathing and loss of appetite. These are signs of bronchitis.

Infection is usually light in older horses because they develop resistance to the parasite and usually have no signs. If foals are infected, they could die from a lungworm infection because they have less immunity. That's why it's a good idea to separate older horses from young foals and to maintain a regular deworming program.



### LUNGWORM: Species & Stages

	<i>Dictyocaulus arnfieldi</i> - adults	<i>Dictyocaulus arnfieldi</i> - L4 Larvae
fenbendazole		
ivermectin		
moxidectin		
oxfendazole		
oxibendazole		
pyrantel pamoate		
pyrantel tartrate-daily		
pyrantel tartrate-single		

Control: See page 18 for product brand names



# Neck Threadworms (*Onchocerca cervicalis*)



**Scientific name:** *Onchocerca* spp.  
**Common name:** Neck Threadworms

**Physical description of parasite:**

Neck threadworms are long and coiled. The male of the species is shorter, being 6 to 7 cm long and the female being up to 30 cm long.

**Stages/lifecycle:**

Unlike many of the other worms that affect horses, the neck threadworm has an indirect life cycle. That means the parasite depends on another organism to get it to the horse. In the case of neck threadworms, that other species is the biting midge. The neck threadworm microfilariae live in the tissue under the horse's skin and are picked up by the midge when it feeds on the horse. The microfilariae develop to infective larvae in the midge's mouth within 25 days. The midge bites the horse again.

**How the parasite enters the horse's system:**

The horse is bitten by an infected midge. The larvae are deposited into the bite wound. They travel to the ligaments in the neck and can also be found in the flexor tendons and suspensory ligaments, particularly of the forelegs.

**Effects of parasite if left untreated:**

Adult worms in the ligaments and tendons cause swelling and pain. There can also be bumps under the skin on ligaments and tendons caused by the hardening of dead worms. If these bumps disable the horse, surgery may be necessary. The presence of the adult worms may also cause lameness and swelling of the ligaments.

The microfilariae may invade the lens of the eye, causing irritation, swelling and sometimes blindness. The microfilariae in the tissue under the skin may also cause skin irritation.



NECK THREADWORM	
	<i>Onchocerca</i>
fenbendazole	
ivermectin	
moxidectin	
oxfendazole	
oxibendazole	
pyrantel pamoate	
pyrantel tartrate	

Control: See page 18 for product brand names

# Pinworms (*Oxyuris equi*)

**Scientific name:** *Oxyuris equi*

**Common name:** Pinworms

**Physical description of parasite:**

The female pinworm gives the species its common name, due to her characteristically long, pin-like tail and large body. Females can be as long as 150 mm (about 6 inches) in length. The male pinworm is much shorter, reaching a maximum length of 12 mm (about 1/2 inch). Pinworm eggs are whitish yellow in color and are usually found in masses near the horse's anus.

**Stages/lifecycle:**

Larvae mature in the large intestine, feeding off the intestinal lining for four to five months. Adult female worms move from the large intestine to the horse's anal area. The eggs she lays are covered with a sticky fluid that causes severe itching.

**How the parasite enters the horse's system:**

The horse becomes infected when he ingests eggs that have dropped into feed or water.

**Effects of parasite if left untreated:**

Most of the effects of pinworm infection are on the horse's appearance and comfort level. Heavily infected horses may be nervous and may decrease eating. The severe itching makes the horse rub his tail and rump so relentlessly that the tail hairs break off. This condition is called "rat tail".

Also, rubbing, biting and scratching can open up the skin in the tail and anal area to infections.



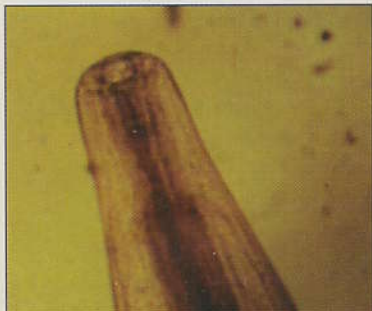
**PINWORMS: Species & Stages**

	<i>Oxyuris equi</i> - adults	<i>Oxyuris equi</i> - L4 larvae
fenbendazole		
ivermectin		
moxidectin		
oxfendazole		
oxibendazole		
pyrantel pamoate		
pyrantel tartrate-daily		
pyrantel tartrate-single		

 Control: See page 18 for product brand names



## Small Strongyles (*Cyathostomes*)



**Scientific name:** *Cyathostomes*.

There are nearly 40 different species of worms that make up this group commonly called small strongyles.

**Common name:** Small strongyles

**Physical description of parasite:**

Often bright red in color, adult worms range in size from 4 mm to 26 mm (about 1/8 inch to 1 inch).

**Stages/lifecycle:**

The adult female worm lays her eggs in the horse's large intestine. The eggs pass from the horse in manure, then hatch into larvae and mature through three stages, the last of which, L<sub>3</sub>, is infective to horses. L<sub>3</sub> larvae attach themselves to grass and are eaten by the horse. After a horse swallows these larvae, they burrow into the intestinal wall, mature and emerge into the large intestine where they feed and lay eggs.



**How the parasite enters the horse's system:**

They enter the horse's system through the mouth when the horse grazes on larvae-infected pasture.

**Effects of parasite if left untreated:**

A horse severely infected with small strongyles can suffer weight loss, diarrhea and colic. However, most infestations are "subclinical", meaning that there are no outward signs of the damage that is occurring inside. New research shows that penetration of the horse's intestinal wall by small strongyles contributes to the disease that has traditionally been connected to larval emergence into the large intestine.

**Signs of infection:**

If small strongyles are allowed to thrive in the horse's system, he can suffer from weight loss (because nutrients are not being absorbed into his system optimally), loss of appetite, diarrhea, and/or colic.



### SMALL STRONGYLES: Species & Stages

Label Summary\*\*

	adults	encysted late L3/L4 larvae	larval stages, general	benzimidazole resistant*
fenbendazole				
ivermectin				
moxidectin				
oxfendazole				
oxibendazole				
pyrantel pamoate				
pyrantel tartrate-daily				
pyrantel tartrate-single				

\*\* See product labels for specific information in what small strongyle species and stages each compound controls \*per registered label claim

 Control: See page 18 for product brand names

## Stomach Worms (*Draschia megastoma* & *Habronema muscae*)



**Scientific name:** *Draschia megastoma* & *Habronema muscae*

**Common name:** Large mouth stomach worms

**Physical description of parasite:**

Adult worms are white in color and about 10 to 25 mm long (about 3/8 inch to 1 inch).

**Stages/lifecycle:**

The larvae of these parasites are ingested by the common housefly or stable fly maggots, which develop in manure. The worms develop inside the flies' maggots. The flies mature and then deposit the larvae on the lips, nostrils, wounds and other naturally moist areas of the horse. The larvae may stay in the area of the wound or may be swallowed by the horse.

**How the parasite enters the horse's system:**

If the horse licks the infested area, the larvae mature in the horse's stomach. Otherwise, they stay in the wound and create oozing, expanding sores.

**Effects of parasite if left untreated:**

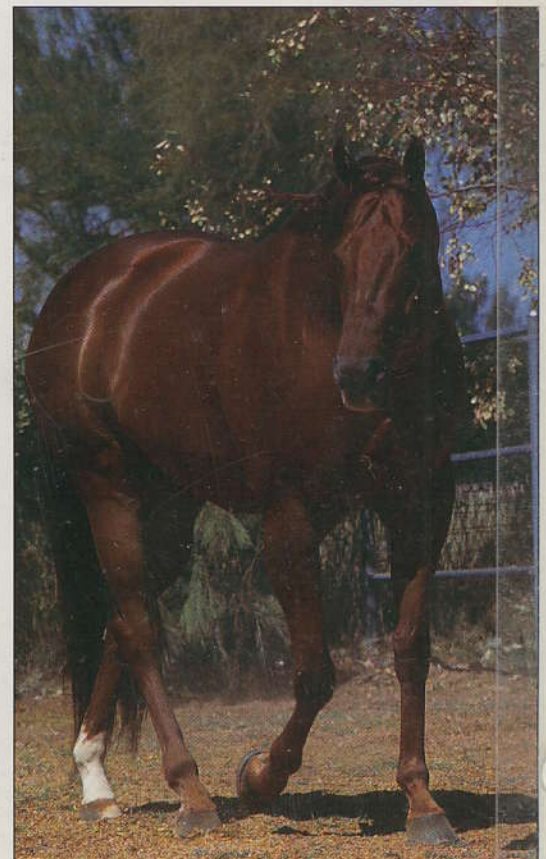
A small wound infected with *Habronema* and *Draschia* larvae can grow much larger, and the larvae prevent healing. These chronic, non-healing wounds are commonly called "summer sores". Larvae deposited in the eyes can cause conjunctivitis (swelling of the mucus lining of the eye lids). Larvae that are eaten can cause gastritis and the formation of tumor-like growths, which may rupture.



### LARGE MOUTH STOMACH WORMS

	<i>Habronema muscae</i>	<i>Habronema</i> L3 Larvae	<i>Draschia</i> L3 Larvae
fenbendazole			
ivermectin			
moxidectin			
oxfendazole			
oxibendazole			
pyrantel pamoate			
pyrantel tartrate-daily			
pyrantel tartrate-single			

Control: See page 18 for product brand names





## Tapeworms (*Anoplocephala perfoliata*)

**Scientific name:** *Anoplocephala perfoliata*  
**Common name:** Tapeworms

**Physical description of parasite:**

Tapeworms have flattened, segmented bodies. The "head" is circular in shape and armed with four suckers. Some tapeworm species can be as long as 80 cm (32 inches).

**Stages/lifecycle:**

Eggs develop in the intermediate host, the oribatid "grass" mite, over a two to four month period. When the infected mites are swallowed, the tapeworms mature within the horse in four to six weeks.

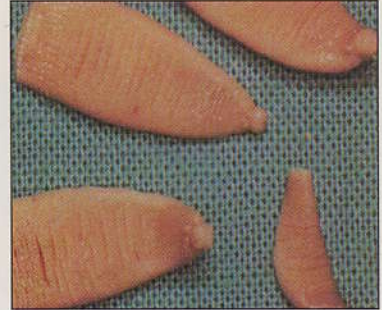
**How the parasite gets into the horse's system:**

Horse ingests infected mites.

**Effects of parasite if left untreated:**

A severe case of tapeworm infestation can cause intestinal irritation, which can lead to inflammation, bleeding, and/or ulcers of the intestine. Fatal intestinal blockage can occur as the worms accumulate at the ileocecal junction – three-way junction between small intestine, large intestine, and cecum (the horse's very large version of our tiny appendix).

**Control Note:** Currently there are no dewormers sold in the United States labeled for Tapeworm control. However, some clinical trials have demonstrated varying effectiveness using *pyrantel pamoate* dewormers. Consult your veterinarian for help with tapeworm treatment and control.



# Deworming Methods

There are at least three ways you can deworm your horse: oral broad-spectrum deworming, rotation, and daily deworming.

## ORAL BROAD-SPECTRUM DEWORMING

Paste wormers have become quite popular among horseowners who maintain a regular schedule of oral administration with a premeasured syringe containing a broad-spectrum dewormer. Each syringe has a full dose in either a paste or a gel compound.

## ROTATION

If your veterinarian recommends rotating dewormers for your horse, one of the things he or she may be trying to prevent is "resistance". Resistance in a parasite population develops because there are a few worms that may survive treatment with a product. These survivors breed and their offspring inherit the ability to survive that same type of dewormer. By rotating between chemical classes, it is hypothesized that the first group of survivors may be killed before they breed more worms that are resistant to the dewormers.

If you choose this method, be sure to rotate between different chemical classes, or you may risk losing any benefits of rotating. Resistant parasites are resistant to **whole classes** of drugs, not just subclasses and/or brand names.

For example, if you're rotating between an ivermectin product and moxidectin, you are not rotating between two different chemical classes, since both are classified as macrocyclic lactones.

Research has shown that parasites, specifically small strongyles, can develop strains resistant to dewormers. In fact, resistance has been shown to occur with most of the benzimidazoles and also to pyrantel pamoate. The drugs simply lose their effectiveness when this happens. That's why your veterinarian may recommend rotation between an ivermectin product, such as ROTECTIN® 1, and a pyrantel pamoate product, such as ROTECTIN® 2. These two are in two distinctly different chemical classes. As an added bonus, ivermectin contains a boticide and has maintained its status as a resistance-free dewormer.

Currently there are no dewormers sold in the United States labeled for tapeworm control. However, some clinical trials have demonstrated varying effectiveness using *pyrantel pamoate* dewormers.

Consult your veterinarian for help with tapeworm treatment and control.

Whatever the reason for deworming, you must pay careful attention to the season and the parasites that are active during that time. In colder climates, bot season is at its peak in early fall and late winter. However, depending on the geographical region, bots can be a year-round problem. At a minimum, make sure the products in your rotation schedule include a boticide during this time of year.

## DAILY DEWORMING

STRONGID® C and STRONGID® C 2x, which contain pyrantel tartrate, are daily dewormers administered in the feed.

Many horse owners use the daily method of deworming because it delivers constant chemical killing of parasites. Parasite larvae are killed before they have a chance to reproduce, which decreases pasture contamination. Ivermectin and moxidectin can also kill immature parasite larval stages before they reproduce.

One potential problem with the daily deworming method is that it may be difficult to be sure your horse is eating all the dewormer with his food. Even if other horses appear to like the taste of the product, every horse is different. And in situations where horses can interact with each other at feeding time, your horse might get chased away from his meal before he's eaten all his daily dewormer. Keep a close eye on his daily intake to make sure he's getting his full dose.

Cost can also be a factor in choosing a dewormer program. A recent study conducted by the Horse Research Center in Ocala, FL., found that single-dose paste dewormers are considerably less expensive than daily dewormers. The monthly per-horse cost for the daily deworming program in this study was \$17.78, compared to the \$3.33 monthly expense for the paste dewormers.<sup>1</sup>

Also, pyrantel tartrate doesn't have any effect on bots.

## TUBING

In the not-so-old days, veterinarians relied on the practice of "tubing" to get the dewormers into the horse's system. The technique, which involves inserting a tube through the horse's nostrils and into the horse's stomach, is now considered to be outdated.

"The tubing technique is rarely used anymore," said Karen E. N. Hayes, D.V.M. "There are other methods now available that for most horses are safer and just as effective, if not more so."

Research has shown that tubing is no more effective than oral dosing – and it's certainly not worth the risk.<sup>2</sup>

# Five Steps to a Single-Dose



Photo courtesy of tre® Animal Health

- 1.** Set the lock on the disposable plunger for your horse's correct weight.
- 2.** Make sure your horse has no food in his mouth, or he might spit it out – with his dewormer.
- 3.** Face the same direction as your horse, in front of his shoulders with his head over your shoulder. Use your free hand to steady his head.
- 4.** Gently insert the syringe into the side of the mouth, behind the incisors and canine teeth and in front of the cheek teeth (where the bit rests when your horse is wearing a bridle). It should be angled toward the back of the horse's mouth.
- 5.** Push the plunger on the syringe to deposit the dewormer on the tongue.

# Deworming Compounds

There are currently three classes of dewormers available that are effective to some degree in controlling horse parasites: macrocyclic lactones, pyrimidines and benzimidazoles. Each class is like a family, consisting of chemical compounds that share common structures and common molecules. However, you should note that effectiveness within chemical classes varies.



## DEWORMING DETAILS

(per registered label and FOI summaries; single-dose application)

Class	Chemical	Brand	Total # of Parasites Species & Stages	Bot Species & Stages	Benzimidazole Resistant Small Strongyles	Horse's Max. Weight Per Syringe (in lbs.)	Breeding Mares/Stallions	Foals	Recommended Treatments Per Year
macrocyclic lactone	ivermectin	ZIMECTERIN®, ROTECTIN® 1, EQUIMECTRIN®, EQVALAN®	34	6	YES	1,250	YES	YES	6 <sup>2</sup>
	moxidectin	QUEST™	22	2	NO	1,150	YES	Restricted Use <sup>1</sup>	4-2 <sup>3</sup>
pyrimidine	pyrantel pamoate	STRONGID®P, ROTECTIN® 2	6	no claim	NO	1,200	YES	YES	6
	pyrantel tartrate (daily)	STRONGID®C, STRONGID®C 2x	18	no claim	NO	N/A	YES	YES	Daily
	pyrantel tartrate (single dose)	MANNA PRO®, PURINA®, KAECO	7	no claim	NO	1,000	YES	YES	6
benzimidazole	oxibendazole	ANTHELICIDE®EQ	12	no claim	NO	1,200	YES	YES	6
	oxifendazole	EQUI-CIDE™, BENZELMIN®	7	no claim	NO	1,000	YES	YES	6
	fenbendazole	SAFE-GUARD®, PANACUR®	5	no claim	NO	1,000	YES	YES	6

(1) Four months of age or older.

(2) For broadest-spectrum control, use ivermectin every eight weeks. Ivermectin has been shown to provide 84-day strongyle fecal egg count suppression. (Study designation QUEST FOI 0876-E-US-5-94.) However, this control is for only one parasite and should not be confused with broad-spectrum parasite control.

(3) Four times per year only for strongyle fecal egg count suppression (one parasite only); no label recommendation for overall parasite control.

Tapeworms - no registered label claims for any products. Consult with your veterinarian.

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# Debugging Deworming Labels

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## What's Lurking In the Fine Print on *YOUR* Dewormer?

### *Make Sure You're Getting Broad-Spectrum Control*

Look carefully at the parasite species and stages each product says it will control. Some dewormers target only a half-dozen internal parasites, while others are effective against a much broader range.

What's *not* on the label can be important, too. If a dewormer doesn't mention "bots", for example, there's a reason. Some deworming products don't have a label claim for controlling bots. For a product to control bots, its label must say "boticide".

To maximize parasite protection for your horse, look for products that offer broad-spectrum control. Ivermectin, for example, is effective against 34 species and stages of parasites and is a boticide. A very effective boticide, ivermectin, controls all stages of the two most common species of bots.

### *Beware of Age Restrictions*

Young foals are particularly at risk from internal parasites and the consequences can be grave. Foals can be treated at 7 days of age to help prevent "foal-heat diarrhea" which can be associated with *Strongyloides westeri* (intestinal threadworms).

Another example is ascarids, or roundworms, which can cause serious problems for foals.

Not all dewormers, however, are labeled for use on young foals. Scan the fine print for age restrictions before selecting a deworming product. Moxidectin, for example, is restricted against use in foals younger than 4 months. Products that are labeled as safe for use on foals without age restrictions can help protect foals during this critical early period. And remember to check which parasites are controlled by your dewormer.

### *Scrutinize Duration Claims*

"Regular deworming is a must for effective parasite control," said Dr. Karen Hayes. "That means establishing a program and sticking to it."

Package instructions will specify how often you will need to deworm your horse for maximum effectiveness. Most deworming products call for reapplication every six to eight weeks.

Some products may claim a longer duration, but take a close look— you may find that their extended killing power applies to only one or two parasite types. QUEST, for example, claims 84-day effectiveness, but that claim applies only to one parasite. Your horse is exposed regularly to other parasites in addition to small strongyles and should be dewormed more often to control the *broadest spectrum* of parasites.

### *Investigate Dosage and Weight Instructions*

Deworming formulations vary, so read those label directions carefully to make sure you're giving the proper dose for your horse's weight. Each single dose syringe of ZIMECTERIN can be used to treat one horse weighing up to 1,250 pounds; a single dose syringe of QUEST treats horses only up to 1,150 pounds; a single dose of SAFE-GUARD treats horses up to 1,000 pounds.

# Other Control Methods

Advances in science and sanitation have helped horse owners control parasite infestation. Dr. Hayes offers these general rules for keeping the parasites under control:

- Whatever deworming method you choose, use it diligently. If you choose rotational deworming, be sure to follow the rules of thumb detailed on page 16 and administer the dewormer every six to eight weeks, or as indicated by laboratory exam of your horse's manure. If you choose a daily dewormer, be sure to add an effective boticide at strategic times – at least twice per year – to kill bots. If you choose to deworm your horse with a broad-spectrum dewormer, make sure the product of choice truly is broad-spectrum. Administer it every six to eight weeks or as indicated by laboratory exam of your horse's manure (and, again, don't forget about bots). Don't blindly accept advertising claims that advocate deworming less often, no matter what the product is, unless there's proof that all the parasites that threaten your horse are effectively killed on that less-stringent schedule.
- Do not spread fresh, uncomposted manure on grazing pastures. Compost manure for at least a year, turning it frequently to produce heat needed to kill the internal parasite larvae. Recent studies have shown that shredded-newspaper bedding reaches higher temperatures when composted than traditional straw or wood shavings, killing more larvae.
- Remove manure from your horse's stall daily. Some horse owners and veterinarians recommend mowing and chain harrowing to help expose larvae to the sun and wind, which can dry out the larvae and kill some larvae. This method works better in hot dry areas. Before you harrow, contact your equine agricultural specialist and/or local university to determine if this method is an effective way to kill parasite larvae in your area.
- Don't overcrowd pastures. Experts advise a minimum of one acre per horse, more if pastures are thin or soil is poor.
- Rotate pastures between cattle, sheep and horses, since parasites are different between species.
- Wash water buckets regularly and replace water daily.
- Use repellents and insecticides as recommended.

# It's easy to control parasites. Just remember:

**W**

## **WORK**

Work with a broad spectrum dewormer.

**O**

## **OBSERVE**

Observe and note even the smallest changes in your horse's behavior, eating habits, manure, coat and general condition. These may be your first clues that there is a parasite problem.

**R**

## **REGULAR**

Regular schedule. Deworm your horse on a regular schedule: every six to eight weeks or as indicated by fecal examinations.

**M**

## **MAINTAIN**

Maintain vigilance.

**S**

## **SANITATION**

Sanitation methods. Make sure your horse's environment is clean and fresh.



## Footnotes

<sup>1</sup> Medical report: cost-effective deworming. *Equus*, 1998; 243: 15.

<sup>2</sup> A guide to effective deworming. *John Lyons' Perfect Horse*, September 1996; 11.

## Acknowledgements

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# Horse Health Record

## Numbers at a Glance:

Veterinarian: \_\_\_\_\_

Farrier: \_\_\_\_\_

Tack & Feed: \_\_\_\_\_

Horse: \_\_\_\_\_

Notes: \_\_\_\_\_

### JANUARY

Vaccination: \_\_\_\_\_

Farrier: \_\_\_\_\_

Vet: \_\_\_\_\_

Deworm: \_\_\_\_\_

Weight: \_\_\_\_\_

### FEBRUARY

Vaccination: \_\_\_\_\_

Farrier: \_\_\_\_\_

Vet: \_\_\_\_\_

Deworm: \_\_\_\_\_

Weight: \_\_\_\_\_

### MARCH

Vaccination: \_\_\_\_\_

Farrier: \_\_\_\_\_

Vet: \_\_\_\_\_

Deworm: \_\_\_\_\_

Weight: \_\_\_\_\_

### APRIL

Vaccination: \_\_\_\_\_

Farrier: \_\_\_\_\_

Vet: \_\_\_\_\_

Deworm: \_\_\_\_\_

Weight: \_\_\_\_\_

### MAY

Vaccination: \_\_\_\_\_

Farrier: \_\_\_\_\_

Vet: \_\_\_\_\_

Deworm: \_\_\_\_\_

Weight: \_\_\_\_\_

### JUNE

Vaccination: \_\_\_\_\_

Farrier: \_\_\_\_\_

Vet: \_\_\_\_\_

Deworm: \_\_\_\_\_

Weight: \_\_\_\_\_

### JULY

Vaccination: \_\_\_\_\_

Farrier: \_\_\_\_\_

Vet: \_\_\_\_\_

Deworm: \_\_\_\_\_

Weight: \_\_\_\_\_

### AUGUST

Vaccination: \_\_\_\_\_

Farrier: \_\_\_\_\_

Vet: \_\_\_\_\_

Deworm: \_\_\_\_\_

Weight: \_\_\_\_\_

### SEPTEMBER

Vaccination: \_\_\_\_\_

Farrier: \_\_\_\_\_

Vet: \_\_\_\_\_

Deworm: \_\_\_\_\_

Weight: \_\_\_\_\_

### OCTOBER

Vaccination: \_\_\_\_\_

Farrier: \_\_\_\_\_

Vet: \_\_\_\_\_

Deworm: \_\_\_\_\_

Weight: \_\_\_\_\_

### NOVEMBER

Vaccination: \_\_\_\_\_

Farrier: \_\_\_\_\_

Vet: \_\_\_\_\_

Deworm: \_\_\_\_\_

Weight: \_\_\_\_\_

### DECEMBER

Vaccination: \_\_\_\_\_

Farrier: \_\_\_\_\_

Vet: \_\_\_\_\_

Deworm: \_\_\_\_\_

Weight: \_\_\_\_\_