

# EQUUS EXTRA

VOLUME 45



BROUGHT TO YOU BY:

**EQUIMAX<sup>®</sup>**

(ivermectin 1.87% / praziquantel 14.03%)

## **DEWORMING**

- Basics of effective parasite control
- Which worms to worry about
- Why fecal egg counts are important

**EQUIMAX<sup>®</sup>**

# GET THE MAX



**EZE-dose<sup>™</sup> Syringe**



**Apple Flavor**



**Gets Tapeworms Too**



[LEARN MORE](#)



EQUIMAX<sup>®</sup> (ivermectin/praziquantel) Paste: FOR ORAL USE IN HORSES 4 WEEKS OF AGE AND OLDER. Not to be used in other animal species as severe adverse reactions, including fatalities in dogs, may result. Do not use in horses intended for human consumption. Swelling and itching reactions after treatment with ivermectin paste have occurred in horses carrying heavy infections of neck threadworm (*Onchocerca* sp. microfilariae), most likely due to microfilariae dying in large numbers. Not for use in humans. Ivermectin and ivermectin residues may adversely affect aquatic organisms, therefore dispose of product appropriately to avoid environmental contamination. For complete prescribing information, contact Bimeda at 1-888-524-6332, or EquimaxHorse.com. © 2020 Bimeda, Inc. All trademarks are the property of their respective owners.

# SURVEILLANCE DEWORMING MADE SIMPLE

Now is the time to switch from calendar-based deworming to a targeted program—for the sake of your horse's health, your pocketbook and the equestrian community at large.

*By Melinda Freckleton, DVM,  
with Christine Barakat*

If you were to provide horse owners with scientifically sound advice on how to protect current and future generations of horses from parasites, while saving themselves money in the process, you'd think most would enthusiastically adopt those recommendations. But, for some reason, that hasn't been the case when it comes to parasite control.

For at least a decade, we've known that targeted deworming programs—which use regular fecal egg counts (FEC) to identify horses that need treatment—are far superior to the traditional calendar-based methods, in which each horse in a herd is treated every eight weeks. Not only is the old system financially wasteful, but it increases the risk that parasites on the property will become resistant to a particular anthelmintic, rendering any product containing that chemical ineffective on that farm for years and possibly forever. (For more on this issue, see “How Resistance Develops,” page 7.)

FEC-based targeted deworming, sometimes called surveillance deworming, identifies the horses in a herd that are shedding significant amounts of parasite eggs and treats only those horses with the appropriate products on a schedule dictated by their response to the treatment. It's an approach that saves money—because many horses will need deworming much less frequently—and reduces the risk of resistance within the parasite population. It's the right

thing to do for yourself, your horse and the equestrian community at large.

Yet, according to the United States Department of Agriculture's National Animal Health Monitoring System (USDA-NAHMS) 2015 study, only 5.5 percent of farms with horses age 4 and older tested manure for parasite eggs and then based their deworming practices on the test results. This means that nearly 95 percent of people caring for mature horses chose to stick with a more expensive parasite control method that becomes less and less effective over time. The numbers aren't much better on farms with more varied equine populations: The same study found the largest group of FEC adopters were operations housing foals, but only 8.2 percent of those reported using surveillance deworming. Why?

My best theory is that switching to a targeted deworming program can seem a little daunting. After all, it's a dramatic departure from protocols established three decades ago and followed religiously ever since. But, in this case, the change is worth it. Surveillance deworming



PAULA DA SILVA

is not the “set it and forget it” type system we’re accustomed to, but it’s not especially difficult, either. As an equine veterinarian, I’ve helped dozens of owners, on small farms as well as huge boarding stables, make the transition. And I hope that by providing you with some information, I will persuade you to consider making the switch, too.

## STARTING THE SWITCH

The first step in the transition to a targeted deworming program is to determine your horse’s parasite status. You’ll do this four to 12 weeks after you delivered the last calendar-based deworming dose, depending on the efficacy period for the product you last used. Waiting this long provides an accurate picture of how many and what types of parasites the horse carries around when there are no dewormers in his digestive tract. Go online to look up the efficacy period, often called an egg-reappearance period (ERP), of the last product you used. ERPs of all deworming products are slowly declining due to resistance, and they vary a bit with geography, but research continues to be done to keep this information up to date.

When you know your product’s ERP, the next step is one you’re already probably familiar with—picking up manure. You need only one or two fecal balls from your horse, not an entire

**TARGETED:** In surveillance deworming, fecal egg counts are used to identify horses in a herd who are shedding significant amounts of parasite eggs. Then only those horses are treated with appropriate deworming products on a schedule dictated by their response to the treatment.



DUSTY L. PERIN

shovelful (which I’ve been handed in a bucket more than once). You’ll want relatively fresh manure that hasn’t dried out or frozen solid. For stall-kept horses this is easy to collect; just walk through the barn before the morning or afternoon mucking. If your horse is turned out with a herd, you’ll need to devise a collection method that ensures you get the right manure. One way is to tie your horse to a hitching post until he defecates. Feeding him can speed up that process. If you have several horses, you may spend the better part of the day waiting, but it’s time well spent. If the weather is mild and you’ll be passing the samples to your veterinarian the same day, the baggies can sit in the tack room. If it’ll be more than 12 hours before they are delivered, or if it’s a particularly hot day, store the baggies in a fridge or cooler so the

parasite eggs do not die off, which will lead to false results.

Your veterinarian will send the samples to a laboratory for a FEC. You could, in theory, send them off to a laboratory and receive the results yourself, but trying to interpret them would be like trying to use your own bloodwork to make adjustments in your own medications: You run the risk of making some serious mistakes. Your veterinarian has the training and experience to fully understand FEC reports and to devise a deworming program based on them. Plus, veterinarians work to stay up to date on the latest research in this area.

The FEC results are reported in numbers of eggs per gram (EPG) of manure. These eggs are from small strongyles, which are the primary parasite of concern in horses. A few

**According to the United States Department of Agriculture’s National Animal Health Monitoring System 2015 study, only 5.5 percent of farms with horses age 4 and older tested manure for parasite eggs and then based their deworming practices on the results.**



## KNOW YOUR PARASITES

### Four species of internal parasites pose the greatest threat to your horse's health:

- **Small strongyles** (*Cyathostomins*). These are the most prevalent parasites in horses and the primary focus of deworming protocols. A few small strongyles do little harm, but in large numbers they can interfere with the absorption of nutrients, causing a horse to be unthrifty. These worms spend a portion of their lifespan encysted in the intestinal walls, where they may not be affected by certain classes of dewormers. If a large number of encysted strongyles emerge at once, serious colic can result.
- **Ascarids** (*Parascaris equorum*). These worms affect mainly foals, with horses developing a natural immunity as they mature. Ascarids can cause slow growth, a dull coat and decreased energy. Heavy infections can block the intestines, causing life-threatening colic or ruptures.

- **Tapeworms** (*Anoplocephala perfoliata*). Infection with these parasites can cause general unthriftiness and anemia. In rare cases, tapeworms can lead to serious colics and perforations of the intestines.

- **Large strongyles** (*Strongylus* spp.). Also called bloodworms, these can cause significant harm in horses but are rare. One species, *Strongylus vulgaris*, migrates through the walls of the abdominal arteries, leaving them prone to rupture.

### Other types of parasite species need to be controlled but aren't quite as worrisome:

- **Botflies** (*Gasterophilus* spp.). While not worms, a portion of the botfly's life cycle occurs inside the horse. Mature flies deposit their eggs on the legs and chests of horses. Then, when horses lick the eggs, the larvae hatch and embed themselves in the tissues of the mouth. Eventually they emerge and are swallowed. The larvae then attach themselves to the wall of the stomach, which can damage the tissues, before turning into grubs that pass out with the feces to mature into flies that begin the cycle again.

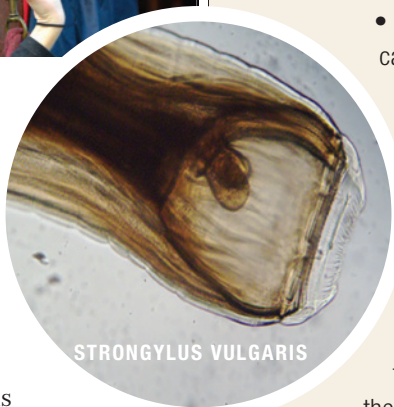
- **Filariads** (*Onchocerca* spp.). The larvae of these worms, transmitted by biting midges, migrate under the skin and may cause itchy dermatitis on the face, neck, chest, withers, forelegs and abdomen. Adults burrow into the neck (nuchal) ligament, where they can cause inflammatory reactions.

- **Pinworms** (*Oxyuris equi*). These worms do little harm to the intestine but can cause intense itchiness when females lay their eggs near the anus. The resulting rubbing can lead to bare patches on the horse's tail and rump. Most horses develop an immunity to pinworms as they mature.

- **Threadworms** (*Strongyloides westeri*). These worms affect mainly foals and can cause severe diarrhea. Most horses develop immunity to threadworms by the time they are 1 year old.



DUSTY L. PERIN



STRONGYLUS VULGARIS

laboratory reports will also include a count of ascarid eggs, which affect mainly younger horses. If you're interested in that information, tell your veterinarian. FECs cannot determine levels of tapeworms because they produce eggs only sporadically. Once a year you'll want to deworm every horse on the property for those using a double dose of pyrantel pamoate or praziquantel. Also, bot eggs won't show up in a FEC because they are laid outside of the horse. But deworming with ivermectin or moxidectin, which you'll be giving for strongyles, will also control bots.

FECs provide an objective representation of how many mature, egg-producing strongyle worms your horse carried at the time the manure was produced. If a horse has less than 200 EPG, he has a low worm burden and is considered a "low shedder." On the other end of the spectrum, a horse with greater than 500 EPG is considered a "high shedder" who carries a relatively heavy parasite burden, even if he looks slick and healthy. Studies have shown that 80

percent of worm eggs in a pasture are shed by 20 percent of the horses, so high shedders have a huge impact on the parasite status of other horses on a farm or in a field.

Don't be surprised if the numbers from individual horses on the same

farm with the same management vary greatly—each horse has a different genetic susceptibility to parasite burdens. Some horses will have a high number of parasite eggs while others kept in the exact same environment will have next to none. Barring any

## CHEMICAL ROLL CALL

Three major classes of deworming chemicals (anthelmintics) are used in horses: Avermectins and milbemycins (macrocyclic lactones) are still largely effective against a wide range of parasites. However, resistance—especially in ascarids—is documented and growing. This class includes:

- Ivermectin, which works against most of the common equine parasites except for tapeworms. It does not work against encysted small strongyles, however.
- Moxidectin, which is similar to ivermectin but also acts against encysted small strongyles.

Benzimidazoles are effective against many adult parasites, but their efficacy against larval stages is declining. This class includes:

- Fenbendazole, which kills large strongyles, pinworms and ascarids.
- Oxibendazole, which kills large strongyles, pinworms, ascarids and threadworms.
- Oxfendazole, which kills large strongyles, roundworms and pinworms.

Pyrimidines, also called pyrantel salts, have several applications and are the only class effective against tapeworms. Resistance is growing among small strongyles. This class includes:

- Pyrantel pamoate, which kills large strongyles, pinworms, ascarids and some tapeworms in a standard dose. When used at a double dose it kills 85 to 95 percent of tapeworms.
- Pyrantel tartrate, which is used for daily feed-through dewormers. It controls large strongyles and ascarids.
- Praziquantel, which works specifically against tapeworms.

significant change in health status, a horse will stay in the same shedding category for his lifetime, so you can't "convert" a high shedder to a low-shedder status through aggressive deworming.

## BUILDING A PROGRAM

If every horse on your farm turns out to be a low shedder, congratulations. This means you might need to deworm all your horses only once or twice a year. The exact timing will depend on your geographic location and even microclimate—worms are less active during cold winter months and dry, parched summers. On the other hand, worms are never dormant in some regions with

### HEAVY BURDEN:

High-shedding horses aren't sickly or weak, they simply need more frequent deworming to stay healthy.

moderate climates. Your veterinarian will be familiar with the parasite cycles in your area and make suggestions. Sometimes it makes sense to do FEC tests quarterly for the first year to see when numbers begin to rise past 500, which indicates that it's time to deworm again. Once you've learned the pattern, you can scale back on the frequency of FECs. You'll always do at least one a year, though, to ensure your program is still working.

Don't be surprised if your veterinarian recommends products from the same chemical class for two consecutive dewormings. With so long between treatments, rotation isn't necessary to maintain the efficacy of the products. You may, for instance, give a macrocyclic lactone product in the spring and another macrocyclic lactone product with pyrimidine added for tapeworms in the fall.

Moderate shedders, with EPGs between 200 and 500, may need three treatments a year. Again, the timing will depend upon the climate, and quarterly FECs can help determine the pattern. With three treatments a year, you're likely to be using products from two or more classes of drugs.

Keep in mind that high-shedding horses aren't sickly or weak; they simply need more frequent deworming to stay healthy. These horses may need four treatments a year, rotated through all classes of dewormers. That's about every 13 weeks. Even with regular treatments, high shedders also need quarterly FECs the first year and twice a year once you're confident of the results of your program.

By now you can see that surveillance deworming means that there is no standard prescription for each type of horse or a scheduled course of treatment that you can put neatly on your calendar. There are simply



DUSTY L. PERIN

too many variables to consider.

For instance, in my area of the country—northern Virginia—we are seeing eggs reappearing after pyrantel treatments in four weeks or less, and four to eight weeks after fenbendazole treatment, so some of our horses are dewormed more frequently. But then, when it's super cold outside, we don't have to deworm as much because the eggs aren't hatching. Nor do we deworm during long, dusty periods in the summer. That said, warm winter weather that allowed the grass to keep growing meant we slid into another deworming period before we got a good freeze. We emailed our boarders and said we'd be doing another round of treatments. In this system, you are constantly evaluating and thinking and adjusting.

## SPOTTING RESISTANCE

If your initial FEC reveals a large percentage of high shedders on your farm (more than a quarter of the tested horses), you'll want to take a second step in laboratory testing to determine if the parasites on your farm have become resistant to the chemical last used.

To do that, administer the same dewormer as soon as possible after you get the results of the FEC—the same day would be ideal. Then take another sample, two weeks later, from the high-shedding horses. The timing is critical because you want to see how the dewormer affects the FEC.

Waiting a few days to deworm after the first test or doing the repeat testing too early or too late may allow other factors to influence the results. If the

anthelmintic you used is still effective, you will see a dramatic drop in the FEC numbers—at least a 70 percent reduction across all horses on the farm (there is a mathematical formula your veterinarian can use to determine this). If that drop does not occur, you likely have resistance to that product on your farm.

It's important to remember that it's not the horse who is resistant to the chemical, it's the parasites that populate your farm. That chemical will not be effective in any horse on your property, possibly for many years. If you have a closed herd, it could take eight to 10 years for a parasite population to diversify enough for the product to be effective again, or it may never happen. If you have a busier barn, with new horses



**COMPARISONS:** Don't be surprised if the egg counts from individual horses on the same farm vary greatly. Each horse has a different genetic susceptibility to parasite burdens. Some horses will have a high number of parasite eggs while others kept in the exact same environment will have next to none.

## HOW RESISTANCE DEVELOPS

When dewormers were developed 50 years ago, a frequent and habitual treatment schedule seemed like just the thing to protect horses from parasites. Turns out, that was a very misguided idea.

Intense deworming schedules, repeated by rote over the decades, led directly to the rise of parasites that are increasingly resistant to the only chemicals we have to fight them. And, if we continue to use the dewormers in the same way, we can expect the situation to become even more dire. Here's how resistance happens:

Individual worms that are resistant to a particular chemical class of dewormer occur spontaneously in a population as a random genetic mutation. This wouldn't be a problem in and of itself because the mutations are relatively rare. But too-frequent and indiscriminate treatments regularly kill off all of the susceptible worms, leaving only the mutated resistant ones to reproduce. After each deworming treatment, a proportionally larger population of invulnerable worms remains to continue their life cycle, passing their resistant genes to the next generation of parasites on that farm. The more frequently a resistance-prone chemical is used on a property, the quicker this happens.

If we could develop a new class of dewormer, we could kill the resistant worms, but we haven't had such a breakthrough for horses in a decade and there are no such new drugs on the foreseeable horizon. The only solution is to slow the rate at which resistance is developing with a more targeted approach to deworming. By identifying each horse's parasite burden, we can tailor treatments to protect their health while still maintaining a genetically diverse parasite population on the farm.

## DOING THE MATH

Will targeted deworming save you money? The answer is a firm “probably.” The economics depend on how many high shedders you have in your herd and the cost of testing in your area, of course. But a respected parasitologist once ran the numbers and determined that if you own a herd of 10 or more horses, the fecal testing plus dewormers will very likely cost less than deworming on an eight-week rotation. In the rare cases where you own a single high-shedding horse, you would end up spending more for FECs plus dewormers, but it’s still worth it, in my opinion, because you’ll have information you need to be sure the treatments you do give are effective—*Melinda Freckleton, DVM.*

coming in regularly, that process may occur within three to five years if you’re lucky. In the meantime, you’ll need to find an alternative product. It’s also important to know that dewormers are not intended to kill every parasite a horse carries. Any chemical lethal enough to parasites to achieve “0” on a FEC would be harmful to horses.

## OPTIONS FOR BOARDERS

If you keep your horse at a boarding barn that’s still on a calendar-based deworming program, you might think you can’t switch to a targeted system. After all, you have just one horse in that environment, and boarding stable owners aren’t always open to suggestions about management changes. I’d still encourage you to try.

First, touch base with the barn owners. Don’t discuss this with fellow boarders before you’ve approached

the management. If your horse is a low shedder, ask if you can submit his FEC results in lieu of regular dewormings. Loop your veterinarian into the conversation, if it’s helpful, and see if everyone can agree to a target FEC number.

You might spend as much money on FECs as dewormings that first year, but if you can regularly demonstrate that your horse isn’t contributing to the parasite population on the farm, the owner may accept fewer FECs the following year. It’s important that you not portray this as a financial issue or an “anti-medicine” position, because it’s neither. You simply want to be a good steward of these important medications to protect their efficacy for other horses on that property.

If your FEC shows that your horse has a high worm burden, you’ll want to deworm him and then retest in two weeks to determine whether the product is still working on that property as I described earlier. If it is not effective, go directly to the barn owner, ideally with a veterinarian for backup. Don’t discuss the FEC results with other boarders. You’ll only start up a rumor mill that will leave everyone upset with everyone else.

The barn owner might want to retest to confirm the findings. That’s a smart thing to do. He or she may change the farm’s deworming protocol as a result or choose to do nothing. In that case, you could then give your horse a different product you know works, or you may decide that this isn’t the best boarding situation and look to move elsewhere.

In my experience, all but the most hard-line barn owners are willing to accept low FECs instead of deworming and, if you approach the situation in a rational way, people usually come on board with targeted deworming after

they understand how it works.

Surveillance deworming works best when an entire barn does it. That can happen even in the largest boarding barn. The first operation I helped switch to this system was a large facility with 60 horses where calendar-based deworming had been done since the 1980s. The barn owner designated a day to collect fecal samples from all horses and had the boarders help, pulling field-kept horses into stalls and waiting for them to produce manure.

With the test results in hand, I created a spreadsheet of horses to keep track of who needed treatments, who didn’t, and who would have follow-up testing. Horses were put into categories, with appropriate deworming protocols devised for each group. We even divided the heavy shedders into three treatment groups to test the efficacy of different types of dewormers that first year.

Fortunately, they all still worked. It was a complex process for sure, but once it was done, it was easy to sustain. New horses coming in have manure collected for an FEC the day they arrive, and they are put into the appropriate category based on the results. I do the same at my own farm where I have boarders.

**O**ld routines can be hard to change, particularly when it comes to keeping horses, but the traditional method of deworming solely by calendar is a habit that every horse owner is obligated to break.

If we are going to protect the efficacy of the dewormers available today, thereby protecting our own horses as well as generations to come, we need to switch to the more modern, results-based system. It may seem like a hassle at first, but there is simply too much at risk to not make the effort. 🐾



# EQUIMAX<sup>®</sup>

(ivermectin 1.87% / praziquantel 14.03%)

## Oral Paste



# GET THE MAX



**EZE-GRIP™**  
Syringe



**Apple**  
Flavor



**Gets**  
Tapeworms Too

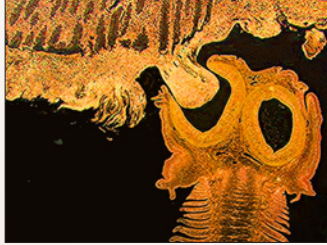
EQUIMAX<sup>®</sup> is the only product currently available that includes protection against **tapeworms, has apple flavoring AND the EZE-GRIP™ syringe.**

- **TREATMENT AND CONTROL** – EQUIMAX<sup>®</sup> provides protection against all major parasites of concern including tapeworms, bots, small and large strongyles, roundworms, lungworms, pinworms, hairworms, large-mouth stomach worms, threadworms and summer sores.
- **TASTE** – EQUIMAX<sup>®</sup> contains smooth, quick-dissolving **apple flavoring.**
- **EASE** – EQUIMAX<sup>®</sup> comes in the **EZE-GRIP™ syringe** making deworming **easy and accurate** because the lockable adjuster, curved finger grip and small syringe allows secure handling each time.
- **COVERAGE** – One syringe of EQUIMAX<sup>®</sup> provides treatment for one horse up to 1,320 lb and is safe for use in horses and foals 4 weeks of age and older, stallions and breeding, pregnant and lactating mares.

	<b>EQUIMAX<sup>®</sup></b>	<b>OTHER AVAILABLE BRANDS</b>	
<b>ACTIVE INGREDIENTS</b>	<b>1.87% ivermectin 14.03% praziquantel</b>	1.55% ivermectin 7.75% praziquantel	2.0% moxidectin 12.5% praziquantel
<b>FOALS (MINIMUM AGE)</b>	<b>4 Weeks</b>	2 Months	6 Months
<b>BREEDING STALLIONS</b>	<b>Yes</b>	No	No
<b>PREGNANT MARES</b>	<b>Yes</b>	No	No
<b>LACTATING MARES</b>	<b>Yes</b>	No	No
<b>SYRINGE DOSAGE</b>	<b>Up to 1,320 lbs</b>	Up to 1,250 lbs	Up to 1,500 lbs
<b>FLAVORING</b>	<b>Apple</b>	No Flavor	No Flavor
<b>EZE-GRIP™ SYRINGE</b>	<b>Yes</b>	No	No

**Important Safety Information:** Not for use in humans. Do not use in horses intended for human consumption. **FOR ORAL USE IN HORSES 4 WEEKS OF AGE AND OLDER.** Not to be used in other animal species as severe adverse reactions, including fatalities in dogs, may result. Swelling and itching reactions after treatment with ivermectin paste have occurred in horses carrying heavy infections of neck threadworm microfilaria (*Onchocerca* sp.). Ivermectin and ivermectin residues may adversely affect aquatic organisms; therefore, dispose of product appropriately. For complete prescribing information, contact Bimeda<sup>®</sup> at 1-888-524- 6332, or [EquimaxHorse.com/PI](http://EquimaxHorse.com/PI). All trademarks are the property of their respective owners.

Dewormers have made serious infections a rarity, but it's still wise to remember the damage that strongyles, tapeworms and other parasites can do.



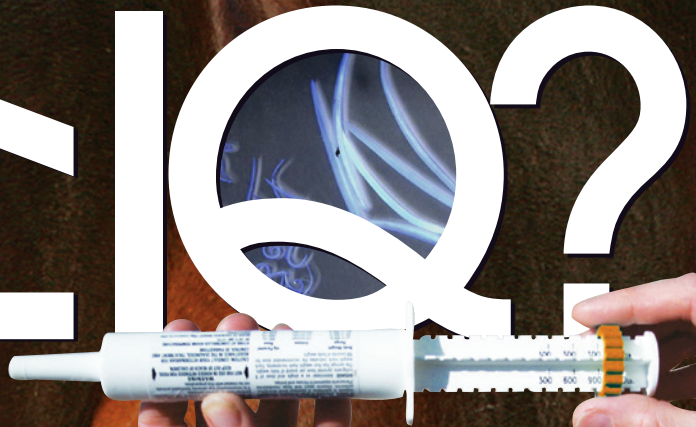
# SITE

Test your knowledge with our **10** question **QUIZ.** 

**WHAT'S YOUR**

# INTERNAL

# PARASITE?



# TEST YOUR KNOWLEDGE

**1.** Also called bloodworms, these parasites migrate as larvae through the walls of the abdominal arteries, causing damage that can lead to rupture or circulation blockage. Some species penetrate the liver or other internal organs. They are among the most dangerous parasites a horse can encounter.

- a. filarids (*Onchocerca* spp.)
- b. small strongyles
- c. large strongyles
- d. ascarids

**2.** Thin, small worms transmitted by biting flies, these parasites take up residence in the nuchal ligament in the neck, where they form nodules. The larvae are found in the skin, where they may induce a maddeningly itchy immune reaction. The larvae may also invade the eyes.

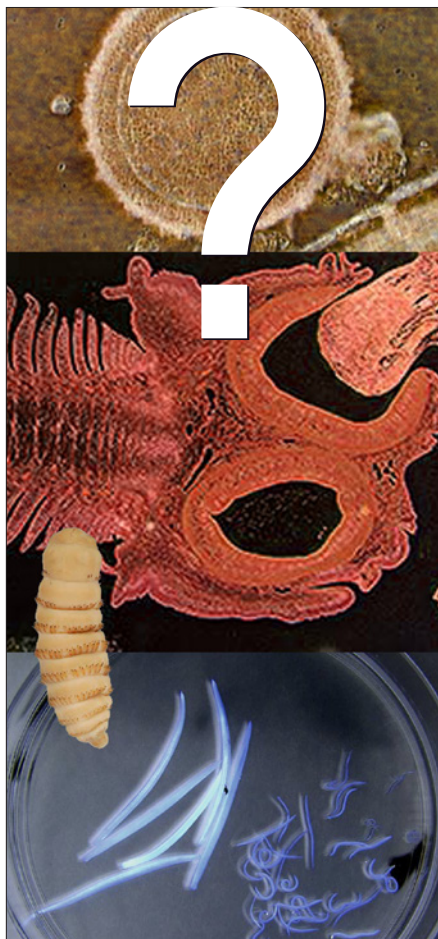
- a. pinworms
- b. filarids (*Onchocerca* spp.)
- c. small strongyles
- d. eye worms

**3.** Found primarily in juveniles, these worms cause severe itching triggered when the female lays her eggs around the anus.

- a. stomach worms
- b. pinworms
- c. ascarids
- d. filarids (*Onchocerca* spp.)

**4.** These worms attach themselves to the intestinal wall, usually near the cecum, via suckers on their head. They may cause inflammation at the point where they attach, and large numbers of them may block the entrance to the cecum and cause impaction colics and intussusceptions, a condition where the end of the small intestine “telescopes” through the valve and into the cecum.

- a. stomach worms
- b. tapeworms
- c. large strongyles
- d. filarids (*Onchocerca* spp.)



**5.** These worms form cysts in the intestinal wall as larvae, then emerge to become adults. When large numbers of the worms emerge at once, the horse may experience colic, weight loss and diarrhea. Severe cases can be fatal.

- a. small strongyles
- b. threadworms
- c. ascarids
- d. pinworms

**6.** As larvae, these parasites use “hooks” to attach themselves to the stomach wall and hang on through the entire winter. In the spring, they detach and are carried out onto the ground in manure.

- a. tapeworms
- b. stomach worms
- c. pinworms
- d. botflies

**7.** Usually the first parasites to infect foals, these worms are passed in the mare’s milk. They may cause diarrhea, but immunity develops before young horses reach their first birthday.

- a. threadworms
- b. pinworms
- c. ascarids
- d. small strongyles

**8.** Typically found only in juveniles, these worms hatch in the small intestine, then migrate through the bloodstream to the liver, and eventually the lungs, before being coughed up and returned to the intestine as adults. The larvae can cause inflammation and scarring in the lungs, and in severe cases the adults may block the intestine.

- a. lungworms
- b. stomach worms
- c. ascarids
- d. tapeworms

**9.** These worms live in the tear ducts, deposited there as larvae by flies drawn to the moisture around the eyes. They may cause excess tearing, conjunctivitis and light sensitivity, but more often horses who carry them show no outward signs at all.

- a. botflies
- b. pinworms
- c. filarids (*Onchocerca* spp.)
- d. eye worms

**10.** These parasites migrate as larvae through the intestinal wall and into the lungs, where they may induce a chronic cough and other respiratory ills. They most commonly affect donkeys and mules, but they may also be found in horses pastured with them.

- a. stomach worms
- b. large strongyles
- c. lungworms
- d. threadworms

# PARASITE IQ QUIZ ANSWERS:



large  
and small  
strongyles

**1. c. Large strongyles (*Strongylus* spp.)** include three species that pose a danger to horses. The most damaging is *S. vulgaris*, which migrates through the abdominal arteries, weakening them so they are prone to rupture; another risk is blood clots that can block circulation in the main artery of the gut, which in turn may lead to several potentially fatal conditions. Less severe signs of *S. vulgaris* infection may include milder colics, weight loss, poor appetite and diarrhea. The other two large strongyles, *S. edentatus* and *S. equinus*, migrate through the liver and other organs before returning to the gut to become egg-laying adults.

**2. b. Filarids (*Onchocerca* spp.)** are transmitted via insect bites. The larvae enter the bloodstream and travel to the nuchal ligament, where they may survive for years. When they reproduce, the larvae, called microfilariae, travel back to the skin, usually of the abdominal midline and groin area, but also sometimes of the neck and head or other areas. There they embed, waiting to be picked up by another biting fly to continue the cycle.

In some horses, the microfilariae produce a severe allergic reaction in the skin, called onchocerciasis or ventral midline dermatitis. Signs include thinning hair, ulcers and crusting.

**3. b. Pinworms (*Oxyuris equi*)** lay clusters of eggs around the anus that may look like white or yellow crusty masses. The fluid that cements them together incites severe itching that may cause a horse to scratch hard enough to remove patches of skin and hair on his rump and tail. Secondary infections may develop in broken skin. Pinworms were once seen primarily in foals but may now be found in horses of all ages.



pinworm

## HOW TO PLAN YOUR OPTIMAL REGIMEN

An effective deworming program requires the use of the right products, administered in the correct dosages at the right times. The variables that will affect your regimen depend on the number of horses you have, the climate you live in and the way you manage your pastures and paddocks.

Ask your veterinarian to review your deworming schedule, especially if you haven't changed it in a while. He'll help you devise a strategy to rotate effective products and target your dewormers toward the parasites that are most likely to be present on your farm.



**4. b. Tapeworms (cestodes)** have segmented bodies; each segment contains a complete set of reproductive organs that can produce eggs. As the worm matures, the lower segments break off and travel out with the manure, leaving the rest of the body behind to continue its growth. The tapeworm life cycle includes an intermediate host, oribatid mites, that live on pasture grasses and are ingested by grazing horses.

Tapeworms are not susceptible to ivermectin or the benzimidazole class of dewormers. Either praziquantel or a double dose of pyrantel pamoate is necessary to control them.



tapeworm

**5. a. Small strongyles (cyathostomes)** include a group of about 40 organisms that develop in cysts in the intestinal wall, then emerge as adults. They might attach weakly to the gut wall, but they apparently feed on organic material within the gut contents.

The worms are small enough that individuals do little harm to the horse, but large numbers emerging at once can cause noticeable signs—usually a general lack of condition, weight loss and diarrhea.

# PARASITE IQ QUIZ ANSWERS:

BOTFLY EGGS: NOTAFLY/WIKIPEDIA; LARVAE: UNIVERSITY OF FLORIDA



botfly larvae

botfly eggs

## 6. d. Botflies (*Gasterophilus* spp.)

include three different species. The most common, *G. intestinalis*, lays its eggs on the hairs of a horse's front legs; when he licks at them, the eggs hatch and the larvae enter his mouth, where they embed within crypts in the tongue and around the cheek teeth.

As larvae mature, they ultimately pass into the stomach. Although they may cause small ulcerations in the stomach lining, the majority of bot infestations cause no clinical signs. However, there is a danger that horses may react strongly and take sudden evasive actions to dodge the adult flies as they approach to lay their eggs.

**7. a. Threadworms (*Strongyloides westeri*)** remain latent in the mare until activated by the birthing process, then they migrate into the mammary glands to be ingested by the foal. They may cause diarrhea, but not all foals will show signs of their presence. Deworming the mare with ivermectin within 24 hours after giving birth will prevent transmission of the worms to the foal. But foals may eventually pick them up from the soil anyhow.

**8. c. Ascarids (*Parascaris equorum*)** may cause weight loss, a dull coat and slow growth; coughing and respiratory signs may be present when the worms migrate through the lungs. Adult worms in the intestine may cause weight loss, colic and diarrhea. Foal growth can be stunted, and large numbers may even block the intestine and cause fatal colic. The eggs can survive for years in soil and on fences, stall walls and other surfaces; foals acquire the worms by ingesting eggs left from the youngsters of previous seasons. Immunity to the worms develops with maturity—horses older than 2 years rarely pass eggs in their manure.



ascarid egg

**9. d. Eye worms (*Thelazia lacrymalis*)** are difficult to detect in horses and often appear to do little, if any, harm. However, they can be implicated in eye infections. Eye masks and other measures to keep flies away from a horse's face will help prevent eye worms. Because face flies, which breed in cattle manure, are the principal carriers of this parasite, pasturing horses separately from cows will also help.

face fly (principal carrier of eye worm)



**10. c. Lungworms (*Dictyocaulus arnfieldi*)** are not typically considered a serious threat in horses; the parasites may cause no signs, or they may produce chronic coughing, rapid breathing, general unthriftiness and a susceptibility to pneumonia in some animals. The adult worms live in the lungs, but their eggs are coughed up and swallowed, and then passed with the manure. The larvae hatch and are ingested by other grazers. ●

## HOW WELL DID YOU DO?

### 0 to 3: Time to review the basics.

Ask your veterinarian to go over with you which parasites are of most concern to horses in your situation, and make sure your deworming program addresses them correctly.

**4 to 6: Very good.** You're familiar with many of the most common parasites that threaten your horse. Look over the others, and make sure you aren't leaving any gaps in your deworming plan.

**7 to 10: Good job!** You clearly know plenty about the parasites that threaten a horse's health, and your deworming regimen probably reflects that. Still, ask your veterinarian to periodically review your practices, just to make sure you stay on track.

A. W. THOMAS

ASCARID: COURTESY, CENTER FOR VETERINARY HEALTH SCIENCE, OKLAHOMA STATE UNIVERSITY



**Winning in their blood.**

**POLYGLYCAN® in their joints.**

- Veterinarian trusted with over a million doses administered since 2006
- High viscosity solution of Hyaluronic Acid + Chondroitin + Glucosamine
- Post-Surgical Lavage / Synovial Fluid Replacement / Viscosupplement
- Patented formulation

**LEARN MORE**



For more information, please visit [www.Polyglycan.com](http://www.Polyglycan.com) or call 1-888-524-6332.



Veterinary Use Only. Patent Nos.: 6,979,679 / 7,485,629 / 8,455,458. CAUTION: This device is restricted to use by or on the order of a licensed veterinarian. WARNING: Do not administer to animals that are to be slaughtered for use in food. Keep out of reach of children. Polyglycan® is a registered trademark of Bimeda, Inc. All rights reserved. © 2020 Bimeda, Inc.