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A Tradition of Leadership and Excellence in Equine Medicine

Internal parasites – The hidden battle
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Deworming is an important part of any preventative health care program in the horse. With all of the products available today, it can become a bit confusing. This month's edition of ***Vet Notes*** is designed to eliminate some of the confusion and help you with this important aspect of health care.

The horse is a host to numerous internal parasites. Parasites steal nutrition and damage internal organs. The typical picture we get in our minds when we think of a "wormy" horse is one of a thin horse with a shaggy, dull haircoat. This is no longer accurate. Today horses are fed a higher plane of nutrition and a parasitized horse may simply be a horse that is not gaining weight at the rate he should or performing at his best. Parasites can even cause abnormalities in reproduction and lactation. The clinical signs seen with parasitism can vary. Some of these signs include: dull hair coat, patchy bald spots, cough, nasal discharge, tail rubbing, mouth lesions, loss of appetite, lethargy, unthriftiness, weight loss, colic, and diarrhea. The consequences of a heavy parasite load can sometimes even cause intestinal rupture and death. However, most of the damage done by parasites involves the larval stages.

The parasite itself isn't the only problem. The immune response produced by the horse against the parasite causes damage as well. Inflammation can cause the bowel lumen to decrease in size and lead to an obstruction type colic. It can also cause the bowel to have abnormal contractions or decrease those contractions, resulting in colic. Nutrient absorption can be delayed or prevented.

By confining horses and housing them together, we have increased their exposure to parasites and their rate of infestation. The life cycle of most parasites involves crawling up blades of grass to be consumed by grazing horses. These larvae are swallowed. They grow and mature inside the horse and become adult egg producers. These eggs are passed in the feces of infected horses and hatch in the soil. Once hatched, the new larvae repeat the cycle.

Traditional thought was that cold winter weather killed parasites, but the opposite is actually true. Parasite eggs and larvae survive through frost conditions. They die quickly in dry, hot weather. The most important time of year to target

parasites in Florida is September 1 through March 1. The warm summer weather can be relied upon to effectively eliminate ***the majority*** of pasture parasites. This "summer kill" is not as effective in northern states.

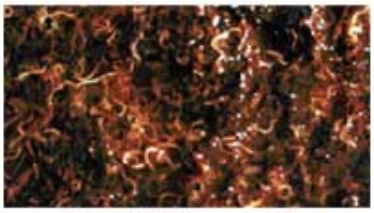
Strongyles

There are two sub-families of strongyles or "red worms": large strongyles and small strongyles.

Large strongyles (*Strongylus vulgaris, S. edentatus, and S. equinus)* migrate through the intestinal arteries in the host. Large strongyles are one of the most deadly parasites of horses. *Strongylus vulgaris* larvae can be found in the anterior mesenteric and other major arteries that supply the intestine. *S. edentatus* travels through the cecum to the liver. Then it travels to the body wall, where it forms nodules. Eventually, it travels back to the cecum and large colon. S*. equinus* migrates in a similar manner as *S. edentatus*, but also invades the pancreas and peritoneal cavity.

Large strongyles can cause severe colic during their migration through the blood supply to the intestine. If the arterial blood supply to the bowel is compromised, this will cause death of the bowel in that area and may cause death of the horse. The adults reside in the large intestine. They have a pre-patent period of 6-10 months. This means that the period of time between ingestion of the parasite by the host and detection of eggs in the feces is 6-10 months. Most of the damage occurs before detection. Ivermectin and Quest are the only anthelmintic (dewormer) that kills the migrating larval stages of this parasite as well as adults at regular dosages. Fenbendazole and oxfendazole effectively kill adults at the regular dose, but must be administered at higher doses to get the migrating larvae.

Small strongyles *(cyathostomes)* have a direct non-migratory life cycle. Larvae have a tendency to migrate within the wall of the large intestine and remain there in arrested development for as long as 2-3 years. They are the most significant internal parasite and risk of infection is highest in the spring. Their pre-patent period is 6-20 weeks, so a negative fecal float does not necessarily rule out infection. The adults reside in the cecum and large colon. The adults, larvae, and developing larvae are susceptible to modern anthelmintics. The larvae in arrested development (encysted small strongyles) in the wall of the large intestine must specifically be targeted, however. When these encysted small strongyles re-emerge they can wreck havoc on the host. They cause "seasonal diarrhea", which is named for its propensity to strike in the late winter or spring in adult horses. This condition is also known as larval cyathostomiasis, and can be fatal. Clinical signs are vague and include: intestinal dysfunction, loss of absorption of nutrients, loss of appetite, weight loss, recurrent colic, fever of unknown origin, acute colitis (diarrhea), dehydration, ventral edema, anemia, and debilitation.



Small Strongyles

The condition is difficult to diagnose. Weight loss and diarrhea are the only consistent signs.

Treatment of this parasite can be particularly confusing. Ivermectin, oxfendazole, fenbendazole (at high doses), and pyrantel tartrate can effectively treat *adults*. However, resistance to benzimidazole compounds (oxfendazole, fenbendazole) and pyrantel salts (pyrantel tartrate) have been reported. Moxidectin has been used for the treatment of benzimidazole resistant adults. Either moxidectin or high doses of fenbendazole are used for treatment of the *encysted small strongyles*. Fenbendazole efficacy should be monitored. To check for resistance, paired qualitative egg counts can be performed. Your veterinarian will perform a fecal exam before deworming and 10-14 days post deworming. If egg counts in the post treatment sample are 10% or greater of pretreatment, you have resistance and your horse will need to be dewormed with a different class of anthelmintic.

Ascarids

The most severe clinical manifestations of this parasite are seen on breeding farms. Ascarids *(Parascaris equorum)*, also known as roundworms, have a direct migratory life cycle. They are generally considered a parasite of younger horses, because adults harbor few worms and do not tend to have patent infections unless they are debilitated or immunocompromised. However, ascarids are a potent source of allergens and could affect adults who are hypersensitized. Ascarids travel through the small intestine to the liver. From the liver, they travel to the lung and finally back to the small intestine. Their pre-patent period is 3 months. The adults live in the small intestine. Here they produce massive quantities of very durable eggs that survive in the environment for up to 5 years! Adults and larvae that are in the intestine are susceptible to modern anthelmintics. The migrating larval stages must be specifically targeted.


Ascarids (Roundworm)

These migrating larval stages can cause a variety of signs. These signs vary with the site of migration and include: decreased growth, dull hair coat, dry skin, weakness, pot belly, decreased appetite, colic, or summer colds. During lung migration, coughing, mucoid nasal discharge, ill thrift, and pneumonia are seen. Adult worms can cause enteritis, decreased growth, colic, obstruction, intestinal perforation, and even death.

Foals should be dewormed at 6-8 weeks of age and then every 6-8 weeks until one year of age with either ivermectin, double dose Strongid or piperazine. Your veterinarian can help you determine if resistance is a problem and treat with another class of anthelmintic. Resistance has been increasing and more adults are having positive egg counts.

Tapeworms

These parasites were covered in detail in last month's edition of ***Vet Notes***. The pre-patent period is 6-10 weeks. Double dose strongid (pyrantel pamoate),

Quest Plus®, Equimax®, and Zimectrin Gold® are effective treatments. These parasites should be targeted twice a year.

Pinworms
(Oxyuris equi) can cause intense itching in horses, but are otherwise non-pathogenic. They reside in the large intestine. During egg laying stages, adults protrude from the anus of the horse. Female worms lay eggs around the anus and cause the horse to rub their tails. Most classes of oral anthelmintics are effective.

Bots
(Gasterophilus intestinalis, G. nasalis, G. haemorrhoidalis, G. pecorum) have a direct life cycle. The adults annoy horses and lay eggs on the face, throat, chest and legs during the summer / fall. The horse ingests the eggs and the larvae spend the winter in the horse's stomach. Hyperplastic reactions, mild gastritis or ulceration can occur in the stomach. Some horses may have large numbers of bots in their stomachs and have no clinical signs. Horses should receive two treatments per year for bots. The first treatment should be approximately one month after first eggs seen and the second should be administered at the end of season.


Bots

Stomach Worms
(Habronema muscae, H. microstoma (majus), and Draschia (Habronema) megastoma) are 6-25mm in size and can cause catarrhal gastritis. Horses are infected by ingesting flies or free larvae emerging from flies as they feed around the lips of the horse. Usually, the horse shows no clinical signs.

Strongyloides westeri
are passed to the foal's small intestine through the mare's milk. They can cause diarrhea in foals from 1-4 weeks of age. Prevention is accomplished by treating mares 24-48 hours after parturition. Ivermectin and oxibendazole are effective.

Deworming / management
The more horses that are kept per square acre, the more intensively managed they must be. If possible, all horses on a farm should be dewormed at the same time. Minimally, those kept together should
be treated at the same time. Stalls should be cleaned daily. If possible, small paddocks / corrals should be cleaned twice a week. This will greatly decrease the horse's exposure to parasites. Proper disposal of manure is important as well. Manure should be properly composted for at least two weeks if it is to be spread on pastures; preferably the waste is removed from further horse contact.

Pasture management includes frequent mowing, especially of the rough patches (where the manure is deposited), dragging to disperse the manure piles for better desiccation, and avoiding overstocking. Rotation of sheep or cattle grazing before returning horses can naturally decrease the larvae contamination because

these species do not share parasites with horses. Feed tubs and waterers must be maintained free of manure.

Recommendations for deworming are general suggestions that must be tailored to each individual farm. Consult your veterinarian for advice and help with surveillance. YEARLY MONITORING MUST BE PERFORMED TO ENSURE YOUR PROGRAM IS EFFECTIVE. Effective dewormer should keep mean fecal counts below 100eggs/gram for the full period between treatments (Fecal egg counts should be reduced by >90% between pre and post treatment to be considered effective.). Resistance can happen from one year to the next and is a silent problem. The latest thoughts on rotation of products is that it is not necessary and has not changed the pattern of resistance. Be sure to give an accurate dosage by weight; use a weight tape.

Here are some general recommendations for North Central Florida:
Horses maintained in training facilities, breeding farms, and boarding facilities are considered at greater risk of exposure to parasites and generally need more frequent deworming. Consider every 6 to 8 weeks. The following anthelmintics can be used:

- Ivermectin Gold®, Equimax®, or Quest Plus® twice yearly for tapeworm control. These may also be used for bots and timed with bot season.
- Panacur Power Pack® or Quest® once yearly for encysted small strongyle removal.
- The rest of the year, products such as Pyrantel (such as Strongid®), Ivermectin, or Quest® can be given every 6 to 8 weeks. Fendbendazole and Oxibendazole seem to have more resistance except when used at higher doses.

Mares can be handled as above except for post foaling. Deworm the mare the day after she foals with ivermectin.

Foals need extra treatment for roundworms. Deworm with pyrantel, or ivermectin every month beginning at 6 to 8 weeks of age until 1 year of age. If these products are ineffective, piperizine can be given by nasogastric tube by your veterinarian.

Horses maintained with low stocking rates or with little exposure to pasture or common paddocks may only need deworming every 3 to 4 months. MONITORING MUST BE PERFORMED TO ENSURE THIS IS EFFECTIVE. The same strategy as listed above for tapeworms, bots, and small strongyles are suggested.

Always read the label carefully – a few products have not been tested in breeding stock or foals