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## Internal Parasites, Fecal Egg Counts, and Deworming Protocols

### What types of parasites are there?

The most common types of parasites seen in adult horses are as follows:

- |   |                                  |
|---|----------------------------------|
| 1. Small Strongyles (Cyathostomins or Cyathostomes) | i.e. - <i>Cyathostomin spp.</i>  |
| 2. Large Strongyles (Blood worms)                   | i.e. - <i>Strongylus spp.</i>    |
| 3. Tapeworms (Flatworms)                            | i.e. - <i>Anoplocephala spp.</i> |
| 4. Roundworms (Ascarids)                            | i.e. - <i>Parascaris equorum</i> |
| 5. Pinworms (Threadworms)                           | i.e. - <i>Oxyuris equi</i>       |
| 6. Bots (Horse Bot Fly)                             | i.e. - <i>Gasterophilus spp.</i> |

### Parasite Facts:

- Changes in parasite fauna of horses have evolved over the years.
  - Large Strongyles now are considered rare in horses.
  - Small Strongyles and tapeworms are more common concerns in adult horses.
- Dewormer (anthelmintic) resistance
  - Highly prevalent with small strongyles and roundworms
- Tapeworms can localize to an intestinal segment called the ileum in the horse.
  - Colic can occur secondary to tapeworm infestation of the ileum.
- Small strongyles are ubiquitous and **all** grazing horses are infected.
  - Disease is typically seen only with high levels of infection.
- Tapeworm and pinworm infections are often missed using a fecal egg count due to limitations in accurate testing.
  - Tapeworm eggs are difficult to find in manure, even with a specialized diagnostic test that is not typically performed. Tapeworm infection is commonly diagnosed by the presence of long flat “ribbon-shaped” adult worms observed in the manure.
  - Pinworm egg packets tend to adhere to the anus and are not shed in the manure.
- Compared to most of the parasites that infect horses, bot flies are relatively benign but their larvae can cause problems in large numbers.



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## Why start a Strategic/Targeted Deworming protocol using fecal egg counts?

Fecal Egg Counts (FECs) help identify infection levels in a horse by determining whether a horse is a high, moderate, or low shedder of parasitic eggs. They also help identify the specific parasites so that accurate medications can be administered to control an infection.

The previous protocol for adult horses was to continually administer dewormers on an every-other-month basis with a different product (Rotational Deworming). While this system was effective in years past, it did not specifically target the parasites infecting each individual horse. Additionally, parasites developed resistance to certain types of deworming medications due to frequent and indiscriminate treatments. The current FEC method (Strategic/Targeted) assesses each individual horse's parasite load along with parasite resistance. This allows veterinarians to customize a strategic deworming protocol suited to each horse's individual needs and parasite load.

The goal of using FECs is to determine the degree of parasite shedding in individual horses, along with parasite resistance identified in that horse. Ideally, adult horses require a dewormer only twice per year, once in the Spring and once in the Fall.

### Dewormer (Anthelmintic) Program Goals:

- Minimize parasitic infection in horses to keep them healthy and prevent clinical disease; eradication is NOT the goal.
- Control and maintain parasite egg shedding levels by minimizing pasture contamination. This prevents reinfection of individual horses and spread to pasture mates.
- Maintain efficacious drugs and avoid further development of anthelmintic resistance.

## Dewormers

Dewormers (anthelmintics) are categorized in four chemical classes: macrocyclic lactones, combined macrocyclic lactones, benzimidazoles, and pyrimidines. The Equine Deworming Chart at the end of this document is a relatively comprehensive list of equine dewormers on the market including their chemical classifications and brand names.

Each category of dewormer targets parasites differently within the horse.

- Some dewormers kill parasites by affecting their energy pathways and growth.
- Some dewormers cause paralysis of the parasite leading to death.



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## Comprehensive Management Program of Parasites

Chemical control using dewormers is just one part of a complete parasite control plan. As parasites are primarily transferred through manure, good pasture management is essential.

Some of the procedures listed below can be helpful in reducing parasite burdens:

- Keep the number of horses per acre to a minimum to prevent overgrazing and reduce pasture contamination with parasite eggs and larvae.
- Pick up and dispose of manure regularly (at least twice a week during the warmer seasons, even in dirt or sand yards).
- Do not spread manure on fields to be grazed by horses. Instead, compost it in a pile away from the pasture before spreading it.
- Mow and harrow pastures periodically to break up manure piles and expose parasite larvae to the elements (larvae can survive freezing, but they cannot tolerate extreme heat and drying for very long).
- Consider rotating pastures by allowing sheep or cattle to graze them, thereby interrupting the life cycles of equine parasites.
- Use a feeder for hay and grain rather than feeding on the ground.
- Remove bot eggs regularly from the horse's haircoat (flea combs work well in some instances).
- Additional suggestions: [Pasture Management](#)

### Collection Procedure of Manure for FEC:

Step 1: Collect fresh, warm feces (2-3 fecal balls) in a zip-lock bag or fecal container (<12hrs old).

Step 2: Remove all air from the zip-lock bag. Label the bag with the horse and owner's name.

Step 3: Place the bag in the refrigerator or on ice until it is delivered to the office. DO NOT FREEZE sample.



## **What happens after submitting a fecal sample?**

Once the fecal sample is received by our office, it will be sent to the laboratory for analysis. The FEC will determine whether each horse is a high, moderate, or low shedder of parasitic eggs and what type of eggs are present. The results are expressed as eggs per gram (EPG) of manure. A FEC of <200 EPG is considered a light parasite load (low-shedder), 200-500 EPG is considered a medium parasite load (moderate-shedder), and 500+ EPG is considered a high parasite load (high-shedder).

If the horse is determined to be a high shedder, our veterinarians will recommend a dewormer based on the type of eggs that were found. Two weeks after administration, we recommend repeating the FEC in order to determine whether or not the dewormer has been effective. If the second FEC has improved, we recommend a retest in 6 months (either Spring or Fall), unless circumstances suggest otherwise.

If the horse is a low shedder, our veterinarians will recommend a dewormer to be administered at that time, but the deworming protocol will be less aggressive and mindful of resistance. Again, the goal is to deworm twice per year (once in the Spring, and once again in the Fall) if that is possible. Ideally, your horse will be tested again in 6 months in either Spring or Fall when parasite egg shedding is most prevalent.



## Targeted/Strategic Deworming Schedule

### Low Shedders (less than 200 epg):

	March	May	September
<b>Option 1</b>	Ivermectin	None	Moxidectin and Praziquantel
<b>Option 2</b>	Moxidectin	None	Ivermectin and Praziquantel
<b>Option 3</b>	Ivermectin	Benzimidazole or Pyrimidine	Moxidectin and Praziquantel

### Moderate Shedders (200-500 epg):

	March	July	November
<b>Option 1</b>	Moxidectin	Benzimidazole or Pyrimidine	Ivermectin and Praziquantel
<b>Option 2</b>	Ivermectin	Benzimidazole or Pyrimidine	Moxidectin and Praziquantel
<b>Option 3</b>	Double Dose Fenbendazole (5 days)*	Ivermectin or Moxidectin	Ivermectin/Moxidectin and Praziquantel

### High Shedders (500 epg and higher):

	March	June	September	December
<b>Option 1</b>	Moxidectin or Double Dose Fenbendazole (5 days)*	Benzimidazole or Pyrimidine	Ivermectin/Moxidectin and Praziquantel	Benzimidazole or Pyrimidine



## Pregnant Mares:

Deworm broodmares based on FECs as usual. When administering vaccinations 4-6 weeks prior to foaling, include a dewormer with ivermectin and praziquantel (Equimax®, Zimecterin Gold®) or moxidectin with praziquantel (Quest Plus Gel®).

## Foal Schedule:

Age	Medication	Brand Name
2 months	Ivermectin	Equell, Zimecterin
4 months	Oxibendazole	Anthelcide EQ
*5 months	Pyrantel Pamoate	Strongid
6 months	Moxidectin with Praziquantel	Quest Plus Gel
8 months	Pyrantel Pamoate	Strongid
*9 months	Fenbendazole	Panacur, SafeGuard
10 months	Ivermectin	Equell, Zimecterin
12 months	Fenbendazole	Panacur, SafeGuard

\*Optional, however, indicates optimal treatment

Working closely with your veterinarian is key to being successful with strategic deworming for your horse. If you have questions specific to your horse, farm, or herd, please do not hesitate to contact Mountain Pointe Equine Veterinary Services at [info@MPEVET.com](mailto:info@MPEVET.com) or 908-269-8451.



## Equine Deworming Chart

Chemical Class	Active Drug	Brands	Mfr.	Large Strongyles	Small Strongyles	Encysted Sm. Strongyles	Roundworms	Pinworms	Stomach Worms	Hairworms	Threadworms	Lungworms	Bots	Tapeworms	Summer Sores
				X	X		X	X	X	X	X	X	X	X	X
Macrocyclic Lactones: Ivermectin or Milbimycin	1.87% Ivermectin	Eqvalan	Merial	X	X		X	X	X	X	X	X	X	X	X
	1.87% Ivermectin	Ivermectin Paste	Generic	X	X		X	X	X	X	X	X	X	X	X
	1.87% Ivermectin	ProMectin E. Paste	Vedco	X	X		X	X	X	X	X	X	X	X	X
	1.87% Ivermectin	Zimecterin	Merial	X	X		X	X	X	X	X	X	X	X	X
	1.87% Ivermectin	Bimectin	Bimeda	X	X		X	X	X	X	X	X	X	X	X
	1.87% Ivermectin	IverCare Paste	Farnam	X	X		X	X	X	X	X	X	X	X	X
	2% Moxidectin	Quest Gel	Zoetis	X	X	X	X	X	X	X	X		X		
Combined Macrocyclic Lactones: Avermectin or Milbimycin + Isoquinoline	1.87% Ivermectin + 14.03% Praziquantel	Equimax	Bimeda	X	X		X	X	X	X	X	X	X	X	X
	1.55% Ivermectin + 7.75% Praziquantel	Zimecterin Gold	Merial	X	X		X	X	X	X	X	X	X	X	X
	2% Moxidectin + 12.5% Praziquantel	Quest Plus Gel	Zoetis	X	X	X	X	X	X	X	X		X	X	
	22.7% Oxibendazole	Anthelcide EQ	Zoetis	X	X		X	X	X	X	X				
Benzimidazoles	10% Fenbendazole	Panacur Paste	Merck	X	X		X	X	X						
	10% Fenbendazole	Panacur POWERPAC	Merck	X	X	X	X	X	X						
	0.05% Fenbendazole	Safe-Guard Equi-bits	Merck	X	X		X	X	X						
	10% Fenbendazole	Safe-Guard Paste	Merck	X	X	X	X	X	X						
	43.37% Pyrantel	Exodus	Bimeda	X	X		X	X	X						
Pyrimidines	43.9% Pyrantel	Pyrantel Paste	Durvet	X	X		X	X	X						
	43.9% Pyrantel	Strongid Paste	Zoetis	X	X		X	X	X						
	2.11% Pyrantel Tartrate	Strongid C 2X	Zoetis	X	X		X	X	X						