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Overcoming clients' preconceived notions can be difficult, especially as newer research suggests that treating horses as individuals might be more effective than a shotgun deworming regimen.

"Talking to a client, I say: 'Your horse doesn't have any eggs right now, you don't need to deworm. And they say, 'Oh, but it's been two months, I have to deworm,'" says Natalie Carrillo, MV, Dipl. ACVIM, professor at the University of Florida College of Veterinary Medicine. "Even though you've got hard proof that their animal doesn't necessarily have to be dewormed, it's very difficult to convince any owner otherwise."



Eggs of the bot fly attach to the hairs on the leg of a horse.



A heavy ascarid infection.

Practitioners have two options; the first is prevention, Carrillo says. The alternate is to get fecal egg counts (FEC) on a monthly basis, and only deworm those that have high parasite load as you rotate pastures.

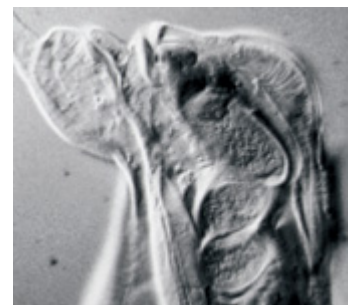
"It's very difficult to get a client to believe that," she says. "That's the biggest problem that we're facing. Nobody wants to go ahead and say 'I'm not going to deworm my animals because we just don't see any fecal eggs'."

While current 8-week protocols that rotate drugs works by and large, some horses on some farms still suffer infestations, requiring the individual treatment of some animals differently from the herd as a whole.

"Today most horse owners continue to follow recommendations based on knowledge that is 30-40 years old," states Ray Kaplan, DVM, PhD, professor at the University of Georgia College of Veterinary Medicine.

For more than 20 years, some species of small strongyles have been fighting back. A recent study suggests that some animals from some farms can pose serious treatment problems. So much so, some veterinarians advocate a more individualized approach as a measure to protect the long-term efficacy of anthelmintics.

"I will tell you that a majority of veterinarians in practice in the horse world are not particularly interested in parasitology, do not stay current with the literature, and don't read the articles in the journals," says Rose Nolen-Walston, DVM, Dipl. ACVIM, professor at the Cummings School of Veterinary Medicine at Tufts University. "I would have to say that most of the advice that horse owners get from their veterinarians is very out of date and not particularly evidence based. I think we have a lot of excellent evidence on what the most appropriate way to deworm horses is, but I don't think DVMs are necessarily giving that advice to their clients. They are recommending to deworm every eight weeks, and rotate dewormer each eight weeks, which is not supported by the literature at this point."



A small strongyle tail shown at 160x.

## Refugia

Parasitologists speculate that refugia, the proportion of the overall parasite population that is not being selected by anthelmintic drugs, can be the key to unlocking proper protocols in any given horse. It is a balancing act because too much refugia means that you are not controlling parasites. **The way to achieve the balance is by not treating all the animals all the time.** Most of the horses don't need to be treated most of the time. The few horses that need to be treated are usually not treated often enough.



A small strongyle egg.

The idea then, is that within the horse population, there are those horses that don't need to be treated because they are managing the parasites naturally via their immune system, and are shedding relatively low numbers of eggs, and therefore there's no medical reason to treat them every time. Those animals need a few treatments at particular times of the year, for particular reasons, which include other parasites (i.e. bots, tapes, ascarids), but they don't require treatment for the cyathostomes, except for one to three treatments per year, sources say. The low-egg shedders are constantly supplying a low level of parasite contamination on the pasture, but it's enough to help dilute out the survivability of the worms. When you treat the high egg shedders that are shedding the resistant worms, you have a dilution effect.

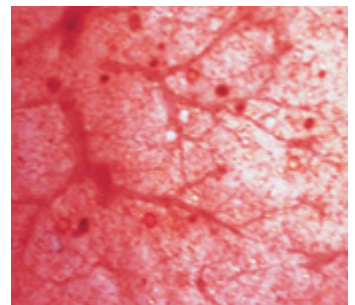


Ascarids protruding from a ruptured intestine of a horse.

"We've got to get away from extremely frequent treatments," says Craig Reinemeyer, DVM, PhD, president of East Tennessee Clinical Research. "We have to determine which drugs are still effective in each and every herd, characterize the susceptibility characteristics of individual horses, and deworm them in a customized fashion, instead of hitting everybody in the herd with the same thing at the same time."

According to Kaplan, a worm control program should begin when worm transmission to horses changes from negligible to probable, in late autumn in the hot Southeast and Southwest, and in the early spring in the moderate Northern climates. Veterinarians should remind owners that there is no point deworming during the summer months in hot climates when transmission of L3 larvae is low, nor during the winter in the North. Veterinarians also should base parasite control on the differences in susceptibility between horses. **Some horses have very poor natural immunity against internal parasites, and need to be dewormed somewhat frequently, while there are other horses that have excellent immunity against parasites and can be dewormed less frequently.**

For the hot climates, begin in ~~September~~ [November\*]. At this initial stage of the worm control cycle, all horses should be treated regardless of FEC, and be so with one of the macrocyclic lactones. This will take care of bots, previously acquired since the spring, *Habronema* and *Draschia* (nematodes responsible for summer sores), sterilize *Onchocerca* (leg or neck threadworms) females preventing transmission; kill pinworms, kill migrating large strongyles and kill small strongyles that are in the intestinal lumen.



Inhibited small strongyle larvae in the mucosa of the large intestine.

**At this same time** an FEC should be done on all horses, and categorize the animals as low (<150 epg, eggs per gram), moderate (150-500 epg), or high egg shedders (>500 epg). Further worming and decisions are then based on FEC, the need to treat for tapeworms later in the year (~~Dec~~ Feb/Mar\*), and the necessity to rotate to other anthelmintics based on the response of the horses and their parasite load. After ~~December~~ [February/March\*], the primary concern is cyathostomes, but the necessity to worm should be dependent on the immunity variation between horses.

## Pasture management

A key addition to anthelmintic use is pasture management, which helps reduce pasture contamination and thereby reduces re-infection throughout the horse herd.

"It is a good to rotate the pastures, particularly if the horse owner has a number of animals," Carrillo suggests.

When the grass is getting low and scarce, the animals are taken off the pasture and that field is worked on, including reseeded and getting the soil back together to renew the pasture. It is good to continue to rotate them as the pastures get worn out. If a few months pass before a horse gets back to a pasture it's been on before, there will be time for the eggs to hatch and the larvae to die, and therefore re-infection is potentially a lot less. In general, you will decrease the volume of parasites that the horse is ingesting from their own fecal contamination of the pasture.

"Ideally you want to keep young horses separated from adults, especially those with high FECs, though often that is hard to do," states Diane Little, DVM, North Carolina State University College of Veterinary Medicine. "You always want to put young horses, especially those that have low immunity, onto clean pastures. The ideal situation would be to cross-graze a pasture for a couple of months with some beef cattle or goats, to clean it up, then to put that year's weaned crop/weanlings/yearlings on that pasture, and then later in the season after they've cleaned that grass up, move your adult horses onto that pasture."



Strongyles attached to the wall of the large intestine of a horse.

It is important not to overgraze or overstock the pastures. It is recommended that the pastures are rested periodically. If it is possible, cross-grazing with other species, is good practice to try to reduce pasture contamination. Therefore when each host eats larval parasites of the other, the larvae are killed.

An increased level of pasture hygiene is necessary, especially with respect to composting manure before it is spread onto the fields. Collection of feces from the pasture twice weekly is recommended. Removal of eggs and larvae by pasture cleaning and composting the feces, removes most of the parasites. Such measures as picking up the horse droppings manually or use of a vacuum sweeper have been used on pastures. Chain harrowing also breaks up manure piles, helping expose the larvae and eggs to the sun and weather helping to kill them.

According to Gene Lyons, PhD, University of Kentucky Gluck Equine Center, there has been some research on spraying pastures with chemicals to kill stages of domestic animal internal parasites, but the problem is that such chemicals may also kill the good organisms, like soil nematodes, arthropods, etc. Experimentally, it has been shown that certain fungi can kill parasite larvae within the manure.

\* These are more accurate dates for our area. B. Character, DVM