

# HEALTH ZONE *Parasites*

## Pasture Management for Parasite Control

BY HEATHER SMITH THOMAS

Horses grazing lush green pastures paint an idyllic picture. But things might not be as serene as they seem—these animals could be ingesting harmful parasites with each bite. Researchers have shown that on most horse farms the vast majority of “internal” parasites lurk in pastures, waiting to be consumed.

The objective of parasite control programs is to interrupt transmission by targeting specific parasites at the proper times, which vary by climate. Because worms have developed (and are continuing to build) resistance to deworming drugs, horse owners should investigate other feasible options for parasite control—for example, pasture management.

Dr. Martin Nielsen, an assistant professor in parasitology at the University of Kentucky’s Maxwell H. Gluck Equine Research Center in Lexington, says horse owners are becoming more interested in pasture management for parasite control, even though there’s little scientific information to guide them in their efforts.

“This is an area that hasn’t been studied lately,” Nielsen said. “For several decades we didn’t think we needed to do any pasture management.” Rather, horse owners assumed they could depend on deworming drugs.

“Now we are waking up from that and facing many questions,” he continued.

### With parasites’ growing resistance to anthelmintic drugs, owners must focus their control efforts on another area: pasture management

This article will address some of those questions and describe ways you can manage your property to reduce worm loads.

#### The Main Culprits

The two major categories of parasites owners and veterinarians must worry about are ascarids (large roundworms) and strongyles.

“These groups are different in their external stages on the pasture,” Nielsen explained. “Strongyle larvae hatch from their eggs and migrate onto forage plants in wet conditions. In comparison, ascarid larvae actually stay inside the eggs, which makes them less susceptible to environmental conditions.”

Foals acquire ascarid infections by ingesting these larvae-containing eggs. If you plow a pasture, ascarid eggs can be relocated to 30 centimeters—nearly a foot—below the soil. Because they cannot move independently, plowing and reseeding every few years can place these eggs in a location where they will remain inaccessible to foraging horses, possibly re-

ducing ascarid populations in pastures. But Nielsen warns that ascarid eggs can survive in the soil for a year or more.

“Because ascarids are mainly a problem in foals, this (life cycle) is a perfect strategy for them,” he said. “Once foals become 8-10 months old they kick these worms out. As adults, they don’t get significant burdens again, but the eggs they passed as foals are still waiting in the environment, ready for another crop of foals.”

On most breeding farms, broodmares go through the same foaling barn year after year and are turned out with their foals in the same paddocks.

“In many places, those paddocks are never plowed,” Nielsen noted. “If eggs can survive several years, depending on climate and environment, plowing every three years might reduce the numbers of eggs waiting in the environment for next year’s foals.”

Sure, there are drugs on the market designed to reduce parasite loads through less labor-intensive means, but, as mentioned, many are losing efficacy against worms such as ascarids. Nielsen says the macrocyclic lactones (ivermectin and moxidectin) are no longer effective on most farms and there’s evidence that worms are also developing resistance against the other two drug classes (benzimidazoles and pyrantel formulations).

“We don’t have any new drugs around the corner, so we may start seeing larger ascarid burdens on farms that have foals every year,” he said.

Managing pastures can also help you control the small strongyles (cyathostomes) that plague more mature horses.

“On any horse farm the majority of these worms are out on the pasture and not in the horses,” said Dr. Andrew S. Peregrine, associate professor in the Department of Pathobiology at the University of Guelph’s Ontario Veterinary College. “How you manage the pasture is more important than deworming when trying to keep parasites down to reasonable levels.”



TRACY GANTZ

Pasture management is important because parasites are building resistance to deworming drugs

Small strongyles winter inside the horse in a dormant stage, embedded in the gut lining, then wake up in the spring to mature and lay eggs that are passed with feces. The eggs hatch and larvae develop through two stages within the manure pile. Third-stage larvae, which are capable of infecting a new horse, leave the manure and migrate onto forage plants to be swallowed. Successful establishment in a new host represents the beginning of a new parasitic cycle.

Employing rotational grazing (moving horses from one small parcel of the pasture to another, leaving them in each area for only a short time so they never graze it very close to the ground) can thwart transmission. The strongyle larvae only access the lower part of forage plants.

“The less aggressively a pasture is grazed, the less the horses are grazing near high-contamination areas,” Nielsen explained; they tend to avoid areas where they defecate.

Researchers conducting several studies during the 1920s and 1930s (before the advent of deworming drugs) looked at pasture management.

“One study was done in the northeastern U.S. where winters are cold,” Nielsen



Rotational grazing can thwart transmission of strongyle larvae

said. “It showed that mowing pastures at the end of the grazing season, after horses were removed but before snow cover arrives, reduced winter survival of parasites. Tall forage, and then snow cover, helps insulate and protect the parasites. If the tall grass is gone, however, undulating temperatures, freezing and thawing, before and after snow cover, is detrimental to the strongyles.”

Plowing pastures, however, is not as effective for strongyle control because some strongyle larvae can migrate through as much as 30 centimeters of soil and make their way back to the surface.

### Stocking Density and Pasture Rotation

Under natural conditions where horses roam freely, they rarely eat grass next

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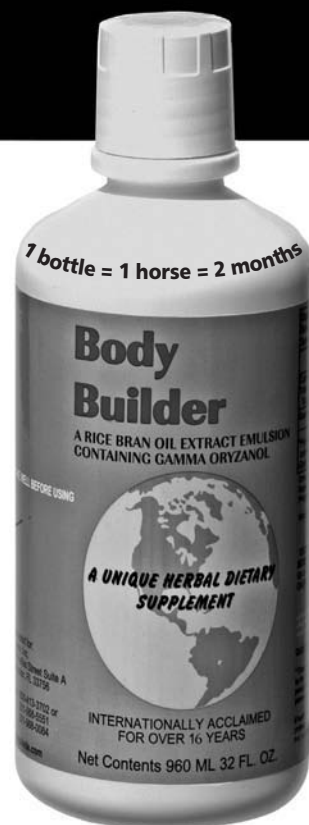


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to manure, says Dr. Thomas Craig of the Department of Veterinary Pathobiology at Texas A&M University. This is nature's way of minimizing parasite loads.

"Once in a while, such as during a drought when feed is short, they will eat grass next to manure piles and pick up a heavy load," Craig said. "Generally, however, in large pastures they get exposed to just a few worms—enough to stimulate some immunity. If the worm load is low, they can handle it."

We intervene in this natural process by confining horses to grazing the same small pasture repeatedly.

Parasite populations tend to be greater if pasture stocking densities are high and horses are overgrazing the land, said Nielsen. Signs of an overgrazed pasture include roughs (areas of tall grass where horses defecate) and lawns (areas of shorter grass where they prefer to graze). One way to avoid overgrazing is to establish the rotational grazing methods described. Some horse owners also practice "mob grazing," which some cattlemen do to improve pasture and soils, using portable electric fencing and grazing small areas with a high number of animals for a very short time. The animals relocate daily—sometimes even two or three times a day. They eat the top parts of plants and trample the rest to provide litter and organic matter to help build the soil. They rarely eat a plant close enough to the ground to pick up parasites. Ideally, owners won't place the animals back onto that piece of pasture until the plants regrow—which in some climates can take six months to a year.



ANNE M. EBERHARDT

Money and time spent on pasture management can pay off in the long run

"But if you rotate horses back to that pasture only three to four weeks later, this is when worms are ready to be ingested," Peregrine warned. "You need to give the pasture time for parasites to be dying off. This will be a lot slower during a hot, humid summer than a hot, dry summer (as heat and drying are detrimental to worms)."

If you are managing a lot of horses on a small pasture you must be especially careful about managing stocking density and grazing rotations. You can determine whether your management practices are paying off by monitoring horses' fecal egg counts to determine their worm burdens.

Alternating haying and grazing a field is another way to break the parasite cycle, said Craig.

"Horses could graze it briefly in the spring, then it could be allowed to grow for

hay," he explained. "The plants the parasites migrated onto were not grazed, but cut for hay instead. Those larvae wouldn't survive on the drying forage. It's safe to let horses graze the regrowth on those hay fields in late summer/fall, without danger of picking up worms."

### Harrowing: Helpful or Harmful?

Dragging pastures to break up existing manure piles can be good or bad for parasite control, depending on your climate.

"In moderate, moist weather, spreading manure around the pasture defeats the horses' protective mechanism against worms—their selective grazing," Nielsen said. "If you spread the feces all over the pasture, horses don't have a chance to stay away from their parasites."

Conversely, in climates with several weeks of constant high temperatures and relatively little precipitation, harrowing might help kill strongyle larvae.

"Once larvae reach the infective third stage (waiting to be ingested) they can't eat and don't acquire any more energy," Nielsen explained. "They only have the lipids and carbohydrates stored in their body. Once those are used up, they die unless they are eaten by a horse. The warmer the environment, the quicker the larvae use up their energy."

Thus, if you can keep horses out of a pasture for a few weeks after spreading manure during a hot, dry period, the field should host fewer parasites. This is true for strongyles but not ascarids, which are still in egg form and more hardy.

### Multi-Species Grazing

Alternating or co-grazing horses and ruminants in a pasture can also help reduce worm populations.

"These species don't share parasites, except for a couple very rare ones," Nielsen said.

Further, cattle graze the tall grass hors-

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## COMPOSTING RESEARCH

**D**r. Mary Rossano, an assistant professor in the University of Kentucky's Department of Animal and Food Science in Lexington, has been researching the effect of composting and windrowing (the production of compost by piling organic matter or biodegradable waste into long rows) manure on parasite populations in horse pastures. In her recently published study, she showed that no strongyle or ascarid eggs survived more than a few days with windrowing. Rossano and her students measured temperature in windrows and determined that the core temperature only had to reach 40°C (about 104°F) to kill the eggs.

"If you windrow manure, this is more effective than traditional compost piles out behind the barn," explained Dr. Martin Nielsen, an assistant professor in parasitology at the University of Kentucky's Maxwell H. Gluck Equine Research Center, who says he has recorded temperatures up to 70°C (158°F) in compost piles.

"This is one of the first papers on practical parasite management in decades," he continued. "Many people are thinking about recycling the manure on farms, and if they pile it up for composting before they spread it, it's not difficult to check the temperature of piles. In (Rossano's)

study, if the temperature stayed that high for five consecutive days, it would kill all the parasites."

"We've always considered roundworm (ascarid) eggs the most resistant of all parasite eggs, able to withstand extremes in heat and drying," added Dr. Andrew S. Peregrine, associate professor in the Department of Pathobiology at the University of Guelph's Ontario Veterinary College. "To discover that the heat of composting can kill these eggs in a relatively short time (four or five days) is fantastic, because an even shorter time would kill strongyle eggs."

—Heather Smith Thomas

es avoid near manure piles. The worm larvae on that forage cannot complete their life cycle within the cow; no eggs will pass.

The same is true with sheep.

"They graze everywhere and don't have specific defecation areas," Nielsen added. "They also graze down the roughs left by horses. The taller grass in those areas helps protect parasites from heat and drying; it shades them from direct sunlight and helps them hold moisture. Grazing these down with cattle or sheep leaves worms more vulnerable to drying."

Depending on climate, mowing the tall grass can be beneficial for this same reason, exposing manure to more heat and causing desiccation.

### Manure Removal

In areas where overgrazing or overstocking is unavoidable, Nielsen says, pasture hygiene becomes the next best step toward reducing parasite loads. Owners can gather or vacuum manure from these pastures and use it for compost. He added that this is particularly cost-effective in high-risk environments, such as pastures filled with foals, because managing the manure costs much less than hospitalizing foals due to parasite damage.

In spring or fall, the larvae hatch from the eggs and become infective over two to three weeks.

"If you remove feces once a week, this will significantly reduce pasture infectivity," Nielsen said. "There may be some horses with egg counts at high enough levels that anthelmintic treatment might be recommended, but with this approach it would be possible to reduce deworming frequency."

Peregrine said there is evidence that removing feces from fields twice a week will have as big an impact on parasite burdens as the most rigorous deworming program (sans resistance).

"Picking up feces was the way people controlled worms, historically, before the advent of deworming drugs," he said. "This practice can be highly effective. I recommend picking up manure twice a week, and even more frequently if the pasture is wet (from rain or irrigation)."

He recalls one farm housing 80 Standardbreds that had significant parasite problems in all ages of horses. The owners spent \$50,000 on a pasture vacuum they use twice a week and no longer have a high parasite load.

### Take-Home Message

Some parasitism is natural and, as long as worm burdens are low, likely won't harm the horse. After all, horses must come into contact with a few parasites to develop immunity.

"It's impossible to eliminate the worms completely," Nielsen said. "We tried that, and the end result is drug resistance." The next step is managing pastures to ensure horses don't pick up many worms in the first place. [BH](#)

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