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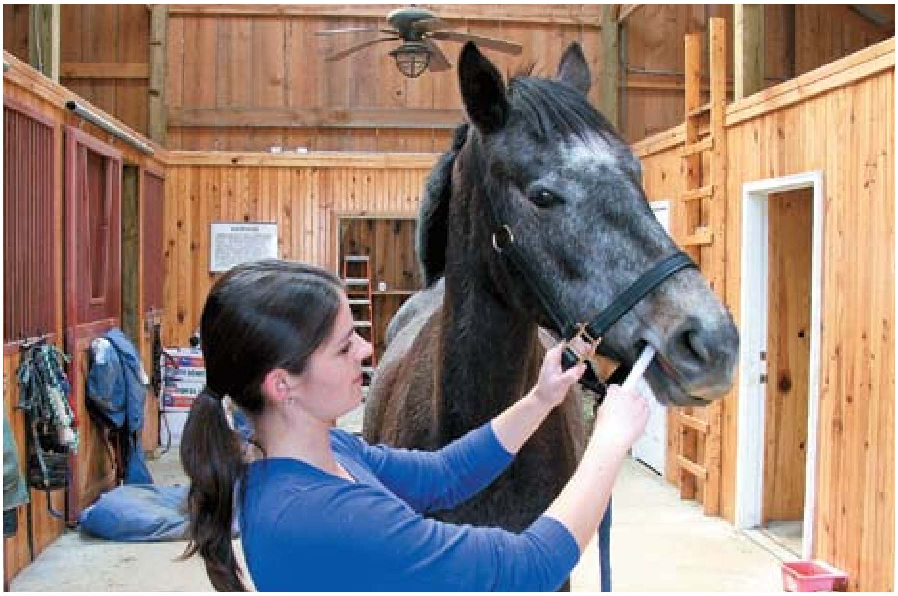
# Parasite Control: 6 Tips on Learning to Live With Worms

BY CHRISTY WEST

No horse owner wants to think of even a single worm burrowing in their horse's innards. But a goal of zero tolerance for worms is no longer a realistic one; increasing resistance of worms (particularly small strongyles) to common deworming drugs means we have to use fewer drugs to avoid creating even more resistant superworms.

Craig R. Reinemeyer, DVM, PhD, president of East Tennessee Clinical Research, discussed the current state of equine internal parasite resistance (primarily in small strongyles) and the new strategies we must use to control it. The basic idea is that we need to use dewormers far less often and more selectively to preserve their value and, yes, even learn to live with the worms to some degree.



MEGAN ARSZMAN

Focus your worm control program on seasons when infective stages are most available on pastures.

## Tip #1: Stop Focusing on the Wrong Things

"'Deworming' as a component of a control program is an unfortunate term, because it emphasizes treatment rather than prevention," he noted. While we tend to think parasite control efforts focus on killing adult worms present in our horses, he says this is entirely the wrong goal. Our objective should be to maximize the health of our horses, and most worms do their worst within a horse as immature larvae. Thus, the better goal is to reduce parasite reproduction and environmental contamination, so there are fewer worm larvae in the next generation to damage our horses.

"Think of reproductive neutralization as the ultimate goal of parasite control," Reinemeyer advised. "By the time we kill adult worms, they've already done their damage. It's much more logical to approach worm control from a preventive rather than a therapeutic standpoint.

"In fact, if someone invented a birth control product for worms, it would provide excellent parasite control even if it didn't kill a single worm" he added.

## Tip #2: Use Worm Biology to Plan Attacks (Not a Calendar)

"It doesn't make any more sense to mow the grass in Minnesota weekly all year-round than it does to deworm all horses everywhere on a regular schedule," Reinemeyer commented. "We ignore the biology of the worms when we just deworm on a schedule."

So let's look at worm biology to plan our attack. Weather conditions vary widely across the United States, and so do the activity patterns of worms in different areas.

"Temperatures of 45-85°F are optimal for development of new parasites," he said. "Below 45°F it's too cold—eggs don't hatch and larvae don't develop, but those that have already made it to the infective stage don't die, either (a "killing frost" might kill plants, but not worms). Above 85°F eggs hatch just fine, but the larvae die quickly."

What this means to horse owners is their worm control plan needs to focus on the seasons when infective stages are most available on pasture—that's generally autumn and spring, during winter in the warmer South, and during summer in the cooler North. No deworming is necessary when environmental conditions are unfavorable for parasite transmission.

"Even if horses have high egg counts during that period, relatively few of those eggs can develop into future parasites," explained Reinemeyer. "Therefore, the objectives of parasite control are being accomplished by the climate, and chemical treatment is not required."

Also, consider biology when planning nonmedical control measures. For example, only drag/harrow pastures to break up manure piles when the weather is hot and dry enough to kill the developing parasites.

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Otherwise, this practice will just spread infective larvae uniformly throughout the pasture so horses will pick them up everywhere they graze. It's also advisable to leave the freshly dragged pasture empty of horses for several weeks to allow the weather to kill the maximum number of parasites that are in infective stages.

## Tip #3: Don't Encourage Resistance

Deworming each horse in the herd every two months applies selection pressure for resistance, because it frequently kills all the worms susceptible to the drugs and leaves any resistant ones in heaven—so many horses to infect and no competition! In this situation they are free to live and reproduce unchecked, they assume a greater proportion of the population with each deworming, and ultimately resistant worms become the major problem they are today.

"It is now recognized that frequent, perennial (deworming drug) treatments are unnecessary and can select strongly for the development of anthelmintic resistance," Reinemeyer stated. "The excesses of the past have resulted in significant present threats and future challenges."

The basic concept behind rotational deworming (using different drug classes for each deworming) was that if worms were resistant to one drug, the next one would get them. However, resistance to two of the three dewormer drug classes—benzimidazoles (i.e., fenbendazole and oxibendazole) and pyrimidines (i.e., pyrantel) has been documented, and there have been some early indications of resistance to macrocyclic lactones (ivermectin/moxidectin) on a few farms. Although resistance varies among farms and herds, it's no longer safe to just assume that simple rotation will kill all the worms (more on finding out if your farm has resistance in a moment).

"The three classes of dewormers that are currently marketed represent the entire armamentarium at our disposal, and that situation is unlikely to change for the next few years," he said. "If a new class of equine anthelmintic (dewormer) were currently in development, it would still require several years before a product could be approved by regulatory agencies for use in the field. Therefore, the existing chemical tools must be used more judiciously to preserve the efficacy that they still provide."

An important concept in reducing drug resistance is to preserve refugia, the proportion of the worm population that is susceptible to those drugs. By maintaining susceptible genes in the mix, resistant worms cannot enjoy an unfair advantage when they survive a deworming. Thus, reducing the amount of drugs we use accomplishes two goals: It helps preserve refugia, and it reduces the selection pressure that promotes resistance.

## Tip #4: Don't Treat All Horses the Same

Just as some humans seem to be more resistant to colds or flu while others catch every bug that comes along, some horses are more susceptible to worms than others. Dosing these less susceptible horses yields very little benefit as they don't have many worms, but it introduces more drugs to the parasites and promotes resistance.

"Individual horses differ markedly in their susceptibility to strongyle infection, and these differences are manifested in the magnitude of fecal egg counts," said Reinemeyer. "More than 80% of all the parasites within a herd might be harbored by only 20% of the hosts. Approximately 50% of the horses in most herds consistently exhibit low fecal egg counts (less than 200 eggs per gram, EPG) even in the absence of anthelmintic treatment. Conversely, a small proportion of the herd (about 20%) may be responsible for the majority of pasture contamination with strongyle eggs, and controlling parasites in these animals will have the greatest impact on the risk of infection for the entire herd."

This brings us to the next important point: Treating horses based on evidence of infection, not schedules or tradition.

## Tip #5: Practice Evidence-Based Parasite Control

Reinemeyer defined the following three questions to ask in order to practice proper evidence-based parasite control:

1) Which anthelmintics are effective in this herd of horses?
2) Which individuals in this herd need minimal, moderate, or intense control measures?
3) What intervals/timing of anthelmintic use are appropriate for controlling the parasites present in these classes of individuals?

Without answering these questions for each herd (particularly the first one), there's a chance the use of a deworming drug will be ineffective at best, unnecessarily costly, and at worst also contribute to greater resistance.

"With the exception of placebos in a clinical trial, no responsible veterinarian would knowingly use a product that was ineffective," said Reinemeyer. "And yet, millions of suboptimal anthelmintic doses are administered every year despite wide dissemination of information about increasing parasite resistance problems."

He advised performing fecal egg count reduction tests (FECRT) on all horses three years of age or older (or 10% of large herds). To ensure there is no interference from the most recent deworming, FECRT should not be performed within eight weeks following the last benzimidazole or pyrimidine treatment, or within 12 (ivermectin) or 16 (moxidectin) weeks after a macrocyclic lactone treatment.

For these tests, horses' feces are collected and examined using a quantitative egg counting technique—the number of strongyle eggs per gram is measured for each horse (see "Fecal Egg Count Reduction Testing Guide," TheHorse.com/5193). This procedure is then repeated by sampling the same individual horses 10-14 days after a subsequent deworming drug treatment. The egg count reduction for each horse tells you how effective the drug was. Ideally, the reduction would be 100%, but FECR of more than 90% is considered satisfactory for benzimidazoles and pyrimidines, while 95% FECR is an acceptable minimum for ivermectin and moxidectin. Repeat this procedure annually to identify any developing resistance problems.

"Successful FECRT will identify the anthelmintic classes to which the resident cyathostomins (small strongyles) are resistant or susceptible," he noted. "If worms are resistant to a particular drug class, products from that chemical group should never again be used singly on the premises for cyathostomin control. Anthelmintic resistance seems to be a permanent genetic feature of a parasite population, and reversion to susceptibility may never occur."

Once you find worms on your property are resistant to a drug class, that class is done; don't use it against cyathostomins again on that farm, and you won't need to repeat a FECRT evaluation for that class.

Also, consideration of the first fecal egg count might allow you to classify each

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horse in a herd as a low contaminator (less than 200 EPG before deworming), moderate contaminator (200-500 EPG), or high contaminator (more than 500 EPG). Reinemeyer commented that parasite susceptibility is genetic in the horse, so one test done at the proper time can probably be used to classify that horse for life.

"Horses that are low contaminators will receive a minimal maintenance program (two deworming treatments per year)," he explained. "The same measures will also be provided for moderate and high contaminators; however, moderate contaminator horses will receive one more intervention (dewormer treatment) than the low contaminator group, and the high contaminator animals will be treated at least one time more than the moderate contaminator horses. Baseline maintenance treatments are recommended in spring and fall, and the additional treatments for moderate and high contaminators will take place during the main season of transmission for a particular climate (i.e., during winter in the South and during summer in the North).

"It is not my intention to introduce a new calendar for control, just to make us think about what we're doing," he added.

While fecal egg counting is an additional cost for your deworming program, the reduction in overall dewormer usage should more than offset that cost. Reinemeyer offered the following hypothetical example: In a 10-horse herd, routine deworming every two months calculates as 60 deworming doses per year. But with deworming according to egg shedding classification (five low contaminators, three moderate, and two high), only 27 doses would be given throughout the year (less than half).

"There's an economic opportunity there, and a selective program is a better one," he noted. "Selective treatment provides adequate parasite control, decreases selection for resistance, and extends the longevity of the few remaining effective dewormers."

The third factor that weighs into deworming schedules is egg reappearance period (ERP), or the time it takes for egg shedding to return to about 80% of pre-treatment levels following a deworming dose. ERPs vary depending on the drug in question (benzimidazoles and pyrimidines have only a four-week ERP, while ivermectin's is six to eight weeks and moxidectin's is 12 weeks), but they tend to be quite consistent in mature horses. Immature horses have less immunity built up against worms, so ERPs are often a third shorter in horses under 3. For moderate/high contaminators, the next dose should be given at the expiration of the previous drug's ERP.

### Tip #6: Be Prepared to Change

"To paraphrase Charles Darwin, it is not the strongest of the species that survives, nor the most intelligent. It's the one that's the most adaptable to change," said Reinemeyer. "Due to the widespread use of effective anthelmintics, strongyles have undergone more adaptations in the last 40 years than in the prior 40 millennia. They've been remarkably successful because they've accepted change and responded to it. Now it's our turn."

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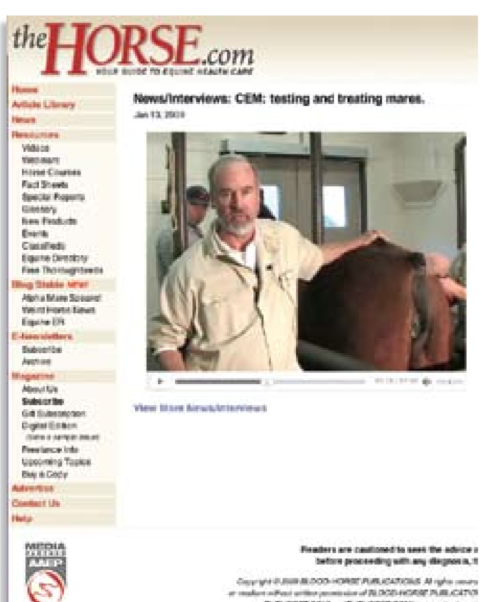


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