



Pastures used for grazing are common places for parasites to thrive

As Parasites Evolve, Treatments are Studied

THERE IS NO 'ONE SIZE FITS ALL' APPROACH

By AMANDA DUCKWORTH / Photos by ANNE M. EBERHARDT

WHILE THE THOUGHT of regular worms is unpleasant, super worms are an international problem. In recent years, research has clearly shown that in an effort to get rid of parasites in horses, the issue has become increasingly more problematic due to anthelmintic resistance.

Horse herds are going to have helminths, or in the vernacular, worms. The dewormer treatments available have been given at such high, and often unnecessary rates, that the worms are building a resistance to them.

For decades, dewormers were given on a rotational basis. Horses were often provided treatment every 60 days, and it worked. The problem is that the available

treatment options have stayed the same for decades as well, meaning the parasites that survived the deworming thrived in the gene pool, and over time, they have become more and more resistant. It is accepted that anthelmintic resistance exists in a population of worms if more than 5% of the worms survive treatment.

In 2019, the Parasite Control Subcommittee of the Infectious Disease Committee for the American Association of Equine Practitioners updated and reviewed strategies and programs for parasite control in horses of all ages. The committee had originally produced a comprehensive set of guidelines in 2013.

“Commonly used strategies for parasite control in adult horses are based largely

on knowledge and concepts that are more than 50 years old,” explained the AAEP. “However, much has changed in this time, necessitating a reexamination of recommendations for parasite control.

“It is important to keep in mind that the information contained within these guidelines are suggestions; there are many variations of these suggested programs that will still meet the same goals and follow the same principles. Ultimately, each farm (with veterinary guidance) should develop its own program tailored to the specific needs of the farm and each animal. There is no such thing as a ‘one size fits all’ program.”

For those following the AAEP guidelines, it is important to note that they were designed around four key points. The first is that when it comes to adult horses, *Strongylus vulgaris* and other large strongyles have become rare, while small strongyles (cyathostomins) and tapeworms have become major concerns. *Parascaris* spp. remains the most important parasite infecting young horses. Second, research has shown that anthelmintic resistance is highly prevalent in cyathostomins and *Parascaris* spp. Third, adult horses require individualized attention in terms of parasite control needs because their innate susceptibility can vary greatly. Finally, horses under the age of 3 are more susceptible to parasite infections.

As disturbing as it may sound, all domestic horses, including Thoroughbreds, are going to have some degree of internal parasites. Instead of rotational treatment plans, it is now recommended that fecal egg counts should be done to determine if a horse needs deworming.

Eradicating parasites is not a reasonable or attainable goal. Rather, it is important to manage the parasitic load so that it does not become large enough to cause health issues. Some potential signs that the parasitic load has become too high include lethargy, weight loss, loss of appetite, poor growth, potbellies, coughing, tail rubbing, and colic.

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Parasite Concerns

dewormer available today, it is the active ingredient that is important. There are only three approved drug classes for parasites in horses: benzimidazoles (fenbendazole/oxibendazole), pyrimidines (pyrantel), and macrocyclic lactones (ivermectin/moxidectin). Each targets specific parasites.

There is well-documented resistance to benzimidazoles, a growing resistance to pyrimidines, and emerging resistance to macrocyclic lactones when it comes to small strongyles. Meanwhile, ascarids have developed a resistance to macrocyclic lactones and now there is evidence of growing resistance to benzimidazoles and pyrimidines as well.

In June 2022, Parasitology Research published “Equine strongylids: Ivermectin efficacy and fecal egg shedding patterns.”

“Equine cyathostomins are ubiquitous in grazing horses around the world and a main target in parasite control programs,” explained researchers. “Anthelmintic resistance has been reported with increasing frequency in these parasites over the past decades, and recent findings of fulminant resistance to the macrocyclic lactone class have raised severe concerns.”

A total of 102 yearlings and 247 mares were part of the study, which was conducted across four different Central Kentucky Thoroughbred farms.

“Evidence of ivermectin resistance was documented in one group of yearlings with a mean fecal egg count reduction of 91.2% and a 95% credible interval of 84.0-95.8,” researchers concluded. “The results from one mare group and one additional yearling group were deemed inconclusive, whereas the remaining five groups displayed no evidence of ivermectin resistance. Strongylid shedding in the mares was not positively associated with any of the evaluated factors.”



Strongylus vulgaris (pictured) has become rarer while small strongyles (cyathostomins) and tapeworms have increasingly become a major concern

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Parasite Concerns

“This study is the first to demonstrate ivermectin resistance in U.S. bred horses, and the findings emphasize the need for routine monitoring of anthelmintic efficacy on horse farms.”

Managing parasites in Thoroughbreds is not only a problem in the United States but worldwide. Research is being done across the globe on the topic. In April 2023, the *International Journal for Parasitology: Drugs and Drug Resistance* published “The first report of macrocyclic lactone resistant cyathostomins in the UK.”



Parascaris spp., known as the equine roundworm, is a parasite of interest targeting young horses

“In recent years, resistance to the benzimidazole (BZ) and tetrahydropyrimidine (PYR) anthelmintics in global cyathostomin populations, has led to reliance on the macrocyclic lactone drugs (ML—of which ivermectin and moxidectin are licensed in horses) to control these parasites,” researchers explained. “Recently, the first confirmed case of resistance to both ivermectin (IVM) and moxidectin (MOX) was reported in the USA in yearlings imported from Ireland. This suggests that ML resistance in cyathostomins has emerged and raises the possibility that regular movement of horses may result in rapid spread of ML resistant cyathostomins. Resistance may go undetected due to a lack of surveillance

for ML efficacy.”

For the study, researchers conducted fecal egg count reduction tests (FECRTs) on four Thoroughbred breeding farms in the UK. They reported that Stud A yearlings had FECRs of 36.4-78.6% after three IVM treatments, 72.6% after MOX, and 80.8% after PYR. Meanwhile, mares on stud A had a FECR of 97.8% and 98% after IVM and MOX treatment, respectively.

They found that resistance to MLs was not found in yearlings or mares on studs

B, C, or D with FECR after MOX OR IVM treatment ranging from 99.8 to 99.9%, but yearlings on studs B, C, and D all had an egg reappearance period (ERP) of six weeks for MOX and stud C had a four-week ERP for IVM.

“It is unlikely that our findings represent an isolated population of ML resistant cyathostomins in the UK, therefore, it is now imperative that measures are put in place to slow the spread of drug resistant cyathostomins, particularly in highly mobile Thoroughbred populations,” concluded researchers. “Ideally, this should include strict quarantine procedures including FECRTs for incoming horses on stud farms with combination worming treatments, as well as wide reaching

surveillance and recording systems to determine the true extent of anthelmintic resistance on Thoroughbred studs.

“Voluntary compliance for these approaches may result in a low uptake, hence these recommendations may require regulatory enforcement. This will be challenging to implement within the Thoroughbred industry as it could ultimately interfere with the ability to sell animals with proven multi-drug resistant cyathostomin infections. Ultimately it is up to the racing industry to deal with the emerging problem of drug resistance parasites, but it is clear that further measures are essential to slow the development and spread of anthelmintic resistance in cyathostomins.”

In May 2023, *Veterinary Parasitology* published “A qualitative study of perceived barriers and facilitators to sustainable parasite control on Thoroughbred studs in Ireland.”

“In view of the rising threat of anthelmintic resistance in parasite populations and the planned change of classification of anthelmintics in Ireland for food animals to prescription-only medicines, there is a need for increased focus on parasite control strategies for horses,” explained researchers. “Effective parasite control programs (PCPs) are complex, necessitating the application of risk assessment based on host immune status, infection pressure, type of parasite, and seasonality to determine the requirement for anthelmintic administration and an understanding of parasite biology to employ effective, non-therapeutic, parasite control measures.”

For the study, interviews were conducted with 16 breeders concerning six areas of interest: parasite control measures (general approach), veterinary involvement, use of anthelmintics, use of diagnostics (pasture management), recording of anthelmintic use, and anthelmintic resistance. Researchers used convenience and purposive (subjective selection) sampling to select a group of participants that reflected the characteristics of current Thoroughbred breeders in Ireland taking

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Parasite Concerns

into account farm type, farm size, and geographical location.

“Assessment of current behaviors by these participants found that PCPs were primarily based on the prophylactic use of anthelmintics without a strategic rationale,” concluded researchers. “A key driver of behavior regarding parasite prevention practices was localized routine, dictated by tradition, that gave breeders a sense of confidence and protection regarding parasite control. The perceptions of the benefits of parasitology diagnostics were varied and their application to control was poorly understood.

“Anthelmintic resistance was recognized as an industry threat but not an issue for individual farms. By using a qualitative approach, this study offers insights into the possible barriers to the adoption of sustainable PCPs on Irish Thoroughbred farms and highlights the need for end-user involvement in the preparation of future guidelines.”

Parasitic concerns extend beyond just Europe as well. In August 2023, the *Journal of Equine Veterinary Science* published “Prevalence, Risk Factors and Diagnosis of Helminths in Thoroughbred Horses Kept at Training Centers in Rio de Janeiro, Brazil.”

Researchers explained that the aim of the study was to determine the prevalence of helminths in Thoroughbred horses in Rio de Janeiro, make correlations with risk factors for these infections, and compare the efficiency of three floatation solutions applied in the quantitative Mini-FLOTAC technique.

For the study, fecal samples from 520 Thoroughbreds were collected from six training centers between 2019 and 2021. Additionally, information on the sex and age of the horses was retrieved from the studbook and data on management styles was obtained from a questionnaire.

“The overall prevalence of intestinal



With horse racing increasingly becoming a global sport, it underscores the importance of routinely reviewing management practices to keep parasites in check

parasites was 71.9%, with significant differences between training centers,” researchers found. “On farm C, 87.7% of the samples presented strongylids and 38.7% had *Parascaris* spp., with the highest egg counts per gram of feces (EPG), of 358.33 and 40.41 respectively. Horses less than 3 years of age were about eight times more likely to be parasitized by strongylids and eleven times more likely to have EPG \geq 500.

“The NaCl solution used in Mini-FLOTAC enabled recovery of the greatest number of samples with high EPG and reached the highest sensitivity



A 2022 study, involving 247 Thoroughbred mares, was conducted at four Central Kentucky farms to determine the prevalence of ivermectin resistance

values in the diagnosis when compared to the other solutions. Moreover, in the diagnoses, the levels of agreement between the results from the solutions used in Mini-FLOTAC were substantial. However, in estimating the EPG, full agreement between the results from the solutions used in Mini-FLOTAC was not obtained.”

Meanwhile, in November 2023, the *International Journal for Parasitology: Drugs and Drug Resistance* published “A national survey of anthelmintic resistance in ascarid and strongylid nematodes in Australian Thoroughbred horses.”

For the study, fecal egg count reduction tests and egg reappearance period tests were done on 22 farms throughout Australia.

“Overall, the study highlights the prevalence of anthelmintic resistance in both ascarids and strongylid nematodes against commonly used anthelmintic products to control worms in Australian horses,” researchers concluded. “The results indicate that ML combination products provided acceptable efficacy at 2 weeks. However, egg reappearance period test calculations suggest that products work less effectively than previously measured.

“It is suggested to regularly monitor the efficacy of the anthelmintics and consider changing the worm control practices to better manage worms and anthelmintic resistance in Australian horses.”

Globally, there is a concerted effort by researchers to better understand and educate about parasites, while also working to find ways to improve the management practices surrounding them before anthelmintic resistance is complete. This is especially relevant to the Thoroughbred community, as horse racing is an international sport, and horses routinely travel away from their homeland. **BH**

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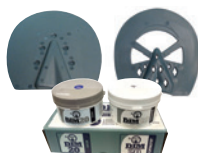
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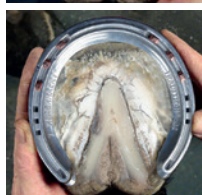
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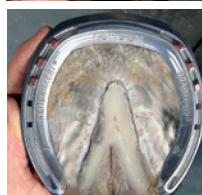
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