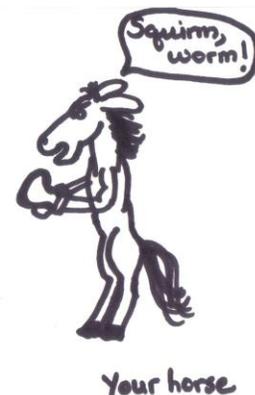




The Deworming Dilemma



Why we aren't going to wiggle our way out of this one

Written by Kara Spillman, DVM in 2013

The discovery of Benzimidazole anthelmintics (antiparasiticides) in the early 1960's was like a miracle cure. Talk to veterinarians and horse owners that were present for the implementation of such drugs, and the change does indeed seem miraculous. In a very short amount of time, morbidity and mortality due to parasitic infections decreased substantially¹, very noticeably in the decreased number of colics. In other words, less horses were getting sick and less were dying from parasite complications. It is no surprise then that since the 1960's and the introduction of Benzimidazole anthelmintics, deworming horses has been part of standard horsemanship practice. For over forty years, the recommendation has been given by the veterinary community to deworm horses regularly throughout the year, sometimes in monthly intervals. As new medications became available, the recommendation became to rotate through a variety of anthelmintics on a routine schedule to target different types of parasites. These wonder drugs became commonplace knowledge among the horse community and a deeply ingrained part of veterinary recommendations for proper horse care. Parasites became one of the least concerns of veterinary professionals, and it seemed that worrying about such issues was a thing of the past, reserved only for the neglected horse or ignorant horse owner.

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For all those pessimists out there that don't believe in miracles, you may have a point on this one. Even within a few years after the discovery of Benzimidazole products such as thiabendazole, resistance to these medications was noted². This group includes the drug fenbendazole, which is the active ingredient in the well-known Panacur® PowerPac, often used as the "go-to" for severe intestinal parasite loads.

Since that time, resistance has been demonstrated in every class of anthelmintics³. Resistance has even been suspected in equines for moxidectin⁴, a potent macrolide anthelmintic that is generally reserved for difficult-to-kill parasites. Unfortunately the ovine (sheep) industry has seen a dramatic effect of resistance to all classes of available anthelmintics⁵, and gives insight into the likely future of equine parasite resistance. As stated by Stephen Love, DVM:

"Entirely new drench groups come onto the market very infrequently. There was a gap of over 20 years between the launch of the macrocyclic lactones (in Australia, ivermectin

² Barger, I., Lisle, K., 1980, Benzimidazole resistance in small strongyles in horses. *American Veterinary Journal*, 55(12):594-595.

<http://www.horsetalk.co.nz/news/2008/04/117.shtml>

³ Tiffany, L. "Parasite Resistance on the Upswing", October 2009 *Veterinary Practice News*. Web.

⁴ Trawford, A.F., Burden, F., Hodgkinson, J.E., 2005.

Suspected moxidectin resistance in cyathostomes in two donkey herds at the Donkey Sanctuary, Uk, in: Proceedings of the 20th International Conference of the World Association for the Advancement of Veter

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http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0009/111060/Drench-resistance-and-sheep-worm-control.pdf

in 1988) and the launch of the next new group, the aminoacetonitrile derivatives (the AADS, represented by monepantel, released in New Zealand in 2009 and in Australia in 2010)".

Based on this history, it will likely be awhile before another safe, effective product in an entirely new class has been discovered for widespread use. So, from these findings, one can conclude that anthelmintic resistance is a growing problem, and that the rate in which resistance is developing is exceedingly faster than the rate in which new drugs are being released for widespread use. With these assumptions, there is a high risk of conventional method of conventional deworming methods becoming ineffective, leading to high parasitic loads and the subsequent problems of diarrhea, colic, and other illness in the general horse population.

Time to panic? Well, no, panicking is never a good idea, but this information is concerning and attention should be paid to the potential deworming problems. Even since their very creation, each anthelmintic has had certain strengths and weaknesses in what parasites they can target and for which they are effective. For instance, Praziquantel has an effective but narrow range of use, and has only been implemented in the elimination in tapeworms⁶. Using medications effectively and as minimally as possible is the key to delaying resistant parasites, minimizing the drug use in your horse, and effectively treating horses with high parasite loads.

The evidence that 80% of the parasites shed come from only 20% of the horse population is now widely accepted in the equine veterinary community. The horses in the 20% group are termed "high shedders", which generally refers to horses that have a fecal egg count (FEC) greater than 500 eggs per gram (EPG) on a fecal quantitative sample⁷. Likewise, "low shedders" are

categorized as horses that have less than 200 eggs per gram on their fecal samples, and "moderate shedders" are the in-between group. By identifying the high shedders in a herd, deworming practices can be concentrated on the few susceptible horses. This allows the horses with effective natural self-immunity to avoid over-medication and ultimately help decrease the total parasite resistance in a herd. Thus, an effective deworming program should attempt to identify the high and low shedders in a population and treat these groups accordingly.

Once the high shedders have been identified in a population, these horses should be monitored closely through a test and deworm program, testing their fecal samples before anthelmintic administration, and then again 14 days post-treatment to ensure effective treatment has taken place. As for the low shedders in the population, various fecal examinations should be taken throughout the year to monitor egg counts as sometimes horses can switch from one group to another⁸, as in a low shedder may become a high shedder and vice-versa.

Comparison of EPG to Percentage of Horse Population		
Egg count level	EPG	Percentage of adult population ^a
Low contaminators:	0-200	50-70
Moderate contaminators:	200-500	10-20
High contaminators:	>500	20-30

^a These values are only estimates and the actual percentage of horses in each category will vary among farms depending on a multitude of factors
Copied from the 2013 AAEP Parasite Control Guidelines⁹

As with almost all medical recommendations, this newer test and deworm protocol does not come without its limitations. For one, the numbers stated to categorize high and low shedders has not been scientifically

⁶ Love, Sandy. Treatment and prevention of intestinal parasite-associated disease. Vet Clin Equine 19 (2003) 791-806

⁷ Nielsen et al, AAEP Parasite Control Guidelines, 2013

⁸ Nielsen et al, AAEP Parasite Control Guidelines, 2013

identified, and is currently based on studies that assume a lack of clinical signs equates to an acceptable parasite load (ie FEC) for an individual horse¹⁰. Unfortunately, this makes the grouping somewhat unsubstantiated until more concrete numbers can be assessed. For instance, it would be important to prove that a horse with less than 200 EPG and no current clinical signs will not have subclinical adverse effects that lead to clinical disease in the future. However, these numbers provide a starting point for categorizing horses that may have less natural immunity versus horses that are able to maintain a small parasite load and remain healthy without any clinical effects.

Secondly, the fecal egg count exam is only as good as the parasites that shed eggs in the feces. There are a number of parasites that do not shed eggs in the manure or that shed so infrequently that they are difficult to detect through traditional fecal examination methods. One most noteworthy parasite that often escapes detection is the tapeworm, which has been shown to be a cause of colic in horses¹¹. For this reason, it is often suggested that a praziquantel product be used at least once yearly in any deworming program¹². I recommend that my patients receive a product that includes praziquantel at least once yearly, given after the first frost in the Fall/Winter season.

Another parasite that often goes undetected through fecal egg counts is the small encysted strongyles, which have now succeeded the large strongyle category in being the number one cause of concern for causing intestinal disease and mortality in the horse^{13 14}¹⁵. Because this parasite can live encapsulated as a larval stage within the horse intestine, it

can go undetected through traditional fecal egg count measures. To make matters worse, being encapsulated within the gut wall also protects these parasites from effectively being treated by most of the conventional deworming medications. Currently, moxidectin (Quest®) and daily double doses of fenbendazole for five days (Panacur® Powerpac) are the only two anthelmintics that appear to have some efficacy against encysted small strongyles, and should be implemented at least once yearly despite fecal examination findings. Unfortunately, as previously noted, fenbendazole has been one of the medications found to be most affected by parasite resistance, and thus the double daily doses commonly used may not be effective in all horses. Thus, for *healthy, mature adults*, I personally recommend a deworming with moxidectin in the Spring after the last freeze to target these hidden parasites. However, moxidectin should NEVER be used in young horses, sick horses, or excessively thin horses as it may cause adverse effects such as neurological signs in susceptible patients. Recommendations for these affected groups are advised on an individual basis.

Additionally, a single fecal test is not always all-inclusive of the total number of eggs shed by a horse. Within a single fecal ball there may be more or less eggs than an adjacent fecal ball, and likewise within different manure piles there may be a variable amount of eggs present. It is thus recommended that samples be taken from multiple fecal balls, and if questions arise to the parasite status of a horse, multiple fecal tests should be performed to properly categorize the horse as a low, moderate, or high shedder. Care should also be taken to make sure the sample is fresh and kept in an appropriate environment to ensure accuracy of the test. Collecting fresh manure and keeping the sample refrigerated in an air-tight container allows it to remain viable for testing for several weeks¹⁶.

¹⁰<https://online.zoetis.com/US/EN/Products/Documents/Fecal%20Egg%20Count%20Tech%20bulletin%20final.pdf>

¹¹ Nielsen et al, AAEP Parasite Control Guidelines, 2013

¹² Ray M. Kaplan, DVM, PhD, DEVPC, Department of Infectious Diseases, College of Veterinary Medicine, University of Georgia, Athens, Georgia

¹³ Nielsen et al, AAEP Parasite Control Guidelines, 2013

¹⁴<https://online.zoetis.com/US/EN/Products/Documents/Fecal%20Egg%20Count%20Tech%20bulletin%20final.pdf>

¹⁵ Love, Sandy. Treatment and prevention of intestinal parasite-associated disease. Vet Clin Equine 19 (2003) 791-806

¹⁶ Nielsen et al, AAEP Parasite Control Guidelines, 2013

Proper collection for Fecal Egg Counts:

- Collect at least a gram of fresh feces (the more the better, at least a handful is a good reference), preferably from multiple manure piles but certainly from several different fecal balls within a manure pile
- Seal the sample in an airtight container or bag
- Samples will remain viable for examination for weeks if kept in a refrigerated environment. Never freeze the samples.

The United States has reported the most resistance to the drug Pyrantel (brand name Strongid®) compared to any other country, and it has been suggested that the constant low-dose use of the drug, such as the daily feeding of Strongid® C™, may be contributing to the parasite resistant problem¹⁷. As Canada and the United States are the only two countries that currently practice this daily deworming practice¹⁸, it seems logical that the daily low – dose feeding of pyrantel might be correlated with the amount of resistance in a population. Because of this, I do not encourage the use of Strongid® C™ in horses that are considered “low-shedders”.

After delving into several intricacies of the current deworming medications, it must be noted that the most effective and highly recommended method for controlling parasites is *environmental control*. This involves proper pasture management, insect control, and keeping an entire herd on a well-developed

targeted deworming program. Although complete removal of parasites from any environment is unlikely, isolated and properly controlled herds stand a very good chance of slowing the progression of parasite resistance and also keeping equine parasite loads minimal.

Unfortunately, many of my patients reside in close quarters where land is a limiting factor and overcrowding is inevitable. Pastures are often shared between barn mates and often it is not possible to allow the pastures to rest from grazing to allow adequate time between contamination. It is also difficult to standardize deworming practices in an entire barn of multiple horse owners and veterinarians that may be tending their horses. However, whenever possible the main principles of efficient manure removal and proper composting should be implemented to attempt to decrease the parasite population within an environment. If an entire barn population can

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Proper environmental management
is the most effective method of
parasite control
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be put on a single test and deworm schedule, the effectiveness of the targeted deworming program increases substantially.

In summary, the increased prevalence of parasite resistance negates that our deworming practices also evolve with the parasite population. By practicing excellent management techniques and following a targeted deworming program, the control of parasites within a herd can be maximized while minimizing the amount of drugs administered.

Kara Spillman, DVM, is the owner and primary veterinarian at Athletic Equine. Her focus is on sport horse medicine, including lameness evaluations and diagnostics. Athletic Equine promotes horse health and optimal performance for horses of all ages and disciplines. Dr. Spillman may be contacted at her email address: kara@drkara.biz

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