

## Strategic Deworming

Although most horse owners recognize the importance of parasite control, their deworming programs often leave much to be desired. Most approaches to parasite control fail to consider the life cycle of the parasites, seasonal patterns of transmission or the potential resistance of both the parasites (to dewormers used) and the horse (to the parasites). Instead, dewormers might be used periodically when signs of perceived or actual parasitism are observed (such as colic, rough haircoats, pot bellies, etc). Other approaches are linked to regular intervals like management events (e.g., quarterly deworming) or farrier visits, neither of which has anything to do with the biology of the worms. The most widely adopted approach to parasite control has been the rotational treatment program developed in the 1960s. This program can be summarized as the deworming of every horse on the farm every 60 days with rotation of dewormer classes between each treatment. The rotational treatment program was based on experimental observations that fecal egg counts (FEC) of horses remained low for a predictable interval after administration of thiabendazole dewormer. Approximately 8 wk after treatment, egg counts began to rise again and inevitably would return to pre-treatment levels. The intent of deworming at specific intervals (60 days) was to maintain low fecal egg counts; this would theoretically minimize environmental contamination with potential infective stages and thereby achieve the primary goal of effective parasite control. At that time, the rotational approach was so effective in controlling parasites that monitoring the continued efficacy of dewormers was considered unnecessary. Ultimately, that has proven to be a serious mistake.

Fast-forward 50 years. As safe and effective, over-the-counter paste dewormers became readily available, “tube worming” became unnecessary, and owners began to formulate their own plans and administer dewormer themselves often with little input from veterinarians. Owners, trainers or boarding stable employees often grossly over- or under-dose dewormers because they only “eyeball” estimate their horse’s weights. Many horses may be resistant to administration of oral medications in general or owners may give dewormer when the horse has a mouthful of hay leading to wastage of much of the dose. Owners may believe they are following a rotational program, but in reality they are “rotating” between products that are all in the same chemical class or they purchase generic or discounted brands of dewormer that may not contain enough active ingredient to be effective. Lastly, most horseowners don’t realize **there have been no new classes of dewormer since the 1980s** (when ivermectin was introduced—remember moxidectin or Quest is in the same chemical class as ivermectin). **However, even if you carefully and correctly administer name-brand dewormer at the proper dosage, faithfully rotating between chemical classes every 60 days, you may still be contributing to parasite resistance on your farm.** This is because every time you deworm, a percentage of parasites are not killed (as much as 20% or more depending on which dewormer you use). Those parasites that are not killed have developed some resistance to that dewormer and they will reproduce resulting in more parasites with resistance. The more frequently a parasite population is exposed to dewormer, the more opportunity they have to develop resistance. **Horse owners must recognize that the three classes of dewormers that are currently marketed (benzimidazoles (Panacur), pyrimidines (Strongid), and macrocyclic lactones (Ivermectin, Quest) represent the entire armamentarium at our disposal and that situation is unlikely to change for the next few years.** If a new class of equine dewormer were currently

in development (which it is not!), it would still require several years before a product could be approved by the FDA for use in the field. Therefore, our goal should be to deworm adequately to keep our horses healthy but not any more frequently than necessary—STRATEGIC DEWORMING.

The major change that has begun to render rotational programs ineffective is the development of dewormer resistance by cyathostomin nematodes (small strongyles). Although there are many other parasites that may populate our horses, such as roundworms or tapeworms, small strongyles are the most damaging to adult horses and widespread resistance to dewormers has not been detected in other types of parasites. However, a survey published recently documented that small strongyle populations in 95% of large horse herds studied in the southeastern United States were resistant to the benzimidazole class (i.e., Panacur), and nearly 50% were also resistant to pyrimidines (i.e., Strongid). Thus, in those herds, dewormer rotation is no longer an option, because only one chemical class (macrocyclic lactones like ivermectin and moxidectin) remains consistently effective against small strongyles. While such widespread parasite resistance has not yet been documented in other parts of the country, there is a possibility that resistance could develop in our area too, especially if deworming programs are not modified.

The **first step** in implementing a strategic deworming program is to develop dewormer susceptibility profiles for the small strongyle population on your farm to identify the best tools for implementing a control program. Dewormer efficacy or resistance can be shown by fecal egg count reduction testing (FECRT). FECRT should be performed on all horses 3 years of age or more, after a sufficient interval has elapsed since their last dewormer treatment; 6–8 weeks after dewormers of the benzimidazole (eg Panacur) or pyrimidine (eg Strongid) classes are used and 10–12 wk after using ivermectin or moxidectin. After a pre-treatment egg count, each horse is treated with an appropriate dose of dewormer. Between 10 and 14 days after treatment, fecal samples are collected from the same individual horses for which you have pre-treatment results, and a second fecal egg count (FEC) is performed. Successful FECRT will identify the dewormer classes to which the resident small strongyles are resistant or susceptible. After initial screening, the continuing efficacy of any drug classes that are still effective should be evaluated by annual FECRT.

The **second step** in implementing a strategic deworming program is to identify which horses in your herd are most susceptible to small strongyles. It is generally recognized that parasites tend to be over-dispersed within populations, so **80% of all the parasites within a herd might be harbored by only 20% of the horses**. This distribution is not determined by the parasites but by the hosts (horses). Each horse's genetics determines his individual susceptibility. Approximately 50% of the horses in most herds consistently exhibit low fecal egg counts (200 EPG) even in the absence of dewormer treatment. This has been shown to be a very consistent trait in individual horses over time. Such animals contribute little to the egg contamination of communal pastures and probably benefit minimally from dewormer treatment. Conversely, a small proportion of the herd 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.

To determine each horse's strongyle susceptibility, a FEC is performed after an appropriate amount of time has elapsed since the last deworming—depending on which dewormer was used. Horses with fecal egg counts <200 eggs per gram (EPG) are classified as low contaminators. Those with egg counts of 200–500 EPG are considered moderate contaminators, and high contaminators are those with fecal egg counts >500 EPG.

The first two steps of a strategic deworming program will reveal the anthelmintics that are effective and will classify mature herd members by their respective strongyle contaminative potentials. The final step is implementation of selective control procedures. Recommendations will vary somewhat from farm to farm but, in general, would be as follows:

- 1) **ALL HORSES** on the farm should continue to be dewormed Spring and Fall (after several hard frosts) with an Ivermectin/Moxidectin product containing praziquantal (ie Quest Plus, Zimectrin Gold) even if they are identified as low strongyle shedders. Individual immunity in adult horses against parasites such as bots and tapeworms has not been studied or documented, so we must assume that all horses need to continue to be dewormed against them periodically.
- 2) Horses under the age of 3 years should be dewormed every 60 days, rotating between effective classes of dewormer. Immunity to parasites develops as the horse matures so young horses are all considered susceptible.
- 3) Horses that are identified as moderate or high shedders should be dewormed every 60 days, rotating between effective classes of dewormer.
- 4) New horses to the property will be subjected to a FEC at the appropriate interval after deworming to establish their level of immunity. Until the results of the FEC are received and the horse has been dewormed if indicated, he should not be turned out on communal pastures or lots, but kept in a “sacrifice” or quarantine lot. Horses that will only be on the property for a short time (ie for shows or short training periods) should also not be turned out on communal pastures.

Selective treatment should reduce dewormer and labor costs, because fewer treatments are administered during an annual cycle. Fecal egg counting constitutes an additional cost; however, resistance needs to be proven only one time for each failed drug class and then annually thereafter for any products that are still effective. Annual FEC are recommended for each horse to ensure that control programs remain adequate. Even so, the direct financial savings are minor compared with the long-term benefits of retaining drug efficacy and decreasing selection pressure for resistance.