

Reducing Parasite Resistance on Equine Operations Using a Comprehensive Whole Farm Approach

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Indiscriminate use of dewormers has caused an alarming increase in resistant equine parasites. Cases of resistant small strongyle parasites are being reported worldwide. Many horse owners contribute to the development of resistant parasites by deworming horses every eight weeks and may be using products that are totally ineffective. Adoption of new deworming practices can decrease the proliferation of resistant parasites and maintain the effectiveness of the products that are available.

The equine team obtained a \$146,000 Sustainable Agriculture Research and Education (SARE) grant which was used to develop a program designed to increase farm manager's knowledge about parasite resistance, reduce the use of dewormers, and document parasite burdens and product resistance on Pennsylvania horse farms.

Education

In order to empower horse owners to make changes in their deworming program, it is important to provide clientele with the knowledge and skills necessary to be confident they are making good management decisions. The project team, composed of Extension Educators, veterinarians, farm owners, and the project consultant determined curriculum content and developed the educational materials for a comprehensive parasite management short course, *Managing Equine Parasites Using a Whole Farm Approach*. In 2015 and 2016, the short course was offered at six locations in Pennsylvania. Topics included: parasite types, biology and behavior; the science of resistance; the importance of establishing a “non-resistant” refuge; conducting and using fecal egg counts; classes of dewormers; the danger of short interval deworming; pasture management and composting as a tool to reduce parasite burdens; and the effects of temperature, rainfall, pasture rotation and manure handling practices on parasite development.

In 2015 and 2016, 221 farmers completed one of 6 short courses offered statewide. 100% adopted at least one practice to reduce parasite burdens, 92% adopted two or more practices. Participants reported a moderate to large increase in knowledge about: parasites and their life cycles (94%); resistance development (91%); fecal egg counts and strategic deworming (88%); and pasture and manure management as tools to reduce parasite burdens (88%). 94% of the participants reported that they planned to use fecal egg counts as a basis for their deworming program; 85% planned to use pasture and manure management practices to help reduce parasite exposure.

Research

The research portion of the project was designed to document parasite burdens on PA farms and evaluate dewormer efficacy. The data collected on the farms enables farm managers to develop farm-specific strategic deworming practices. The farm partners met at predetermined sites and conducted fecal egg counts on all horses on the farm in order to monitor egg shedding and identify low and high “shedders”. Dewormer efficacy was determined by conducting pre and post deworming egg counts for the products that were provided. Although no farms were prevented from participating in the project, only those farms with a minimum of three horses that were moderate to high shedders were included in data analysis. Since lack of monitoring equipment is an obstacle to conducting egg counts, participants utilized microscopes

and supplies strategically placed in Extension offices. Trained Extension staff provided assistance and ensured that protocol was followed.

In 2015 and 2016, 66 horse farms representing 679 horses, in 19 PA counties enrolled as partners in the research project and reported the following impacts that the project had on their farm operation:

<u>2015</u>	<u>2016</u>	
100%	100%	stated that they were able to identify the high shedders on their farm
95%	100%	were able to identify the horses that had good immunity against small strongyles.
95%	100%	were able to determine the effectiveness of the dewormers they used.
81%	94%	were able to reduce the use of dewormers
95%	89%	stated that the project reduced their fear of parasites.
100%	100%	stated that the project increased their confidence in surveillance based deworming
100%	94%	stated they planned to conduct fecal egg counts on new horses
68%	79%	took steps to improve pastures to reduce grazing near manured areas
45%	26%	removed manure from pastures.
79%	58%	eliminated harrowing pastures or restricted harrowing to late fall.

Product Resistance

In order to monitor egg shedding and identify low and high shedders, the farm partners and Extension staff met every 8 to 12 weeks to conduct fecal egg counts. De-worming efforts were focused on horses with moderate to high small strongyle egg contamination potential. Product resistance occurs at the farm level and was determined by conducting pre and post deworming egg counts on all horses on the farms. For the purpose of the study, only data collected from farms that had a minimum of 3 horses that were moderate to high shedders (generally 300 to 500 eggs per gram) was utilized to determine product efficacy. Resistance was indicated when pyrantel and benzimidazole dewormers failed to reduce egg shedding by at least 90%; ivermectin by 95%.

In 2015 and 2016, 66 farms participated in the study. Many of the farm managers discovered that horses on the farm did not shed any eggs or were low shedders during the monitoring period. Of the qualified farms that had a minimum of 3 horse that were moderate to high shedders, 82% showed reduced efficacy when dewormed with pyrantel and 95% showed reduced efficacy when dewormed with fenbendazole. This would indicate that there is significant resistance to these products on PA farms. Ivermectin showed 100% efficacy on all qualified farms.

Conclusion:

What we have learned to date is that:

- Most PA horses in the study have good immunity to small strongyles and the immunity remains consistent. High shedders tend to remain high and need to be strategically dewormed.
- There is significant resistance to pyrantel and fenbendazole on many but not all Pennsylvania farms.
- It is critical for horse owners to use a comprehensive approach to manage parasites to reduce the rate of resistance development.
- Farm managers will adopt changes to their parasite management program when they have the knowledge and tools necessary to make those changes.

- Horse owners and farm managers are extremely dedicated and readily participate in projects that benefit their horses and the equine community. The bond of trust that is generated in working together and the strong relationships that develop along the way is priceless.

Comments from our Farm Partners:

- *This was a very worthwhile venture on many levels. The well-being of my animals. Savings. Making the most of my pastures. EDUCATION IS GOOD!*
- *Over worming is not doing our horses any favors. Doing fecal egg counts is easy & I can do them myself & will in the future.*
- *We have already shared the information we've learned with our horse club at a monthly meeting & others would like to try this.*
- *I found this project very effective and important. Thank you! An exceptional Extension program.*

Comments from our consultant Dr. Martin Nielsen, DVM, PhD, DEVPC, DAVCM published in Equus, a national equine magazine:

“I am currently involved in a project in Pennsylvania, where the Extension service received a three year (SARE) grant to disseminate information about surveillance-based parasite control programs. The group reached out to me to help them implement a plan and I was happy to travel to educate Extension officers in various regions around the state on how to do egg counts and direct horse owners toward the best practices. This initiative and energy will change a lot of things in that state for the better. I think that could be a fabulous model for other states. If Pennsylvania can do it, why not Kentucky? Why not every state?”