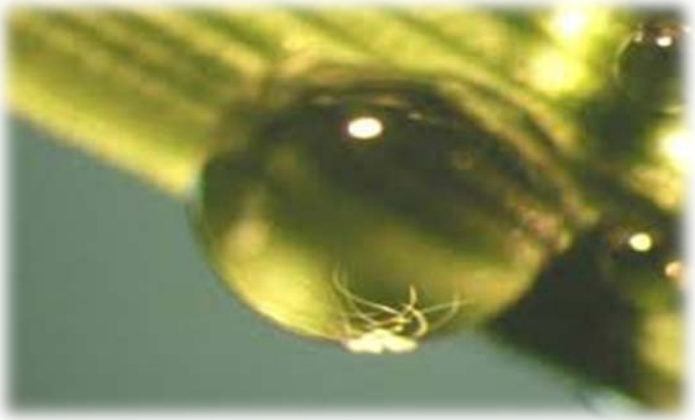
Reducing The Threat Of Equine Parasite Resistance Using A Whole Farm Approach

Module 2. Equine Parasite Resistance – How Does it Happen? Can it Happen to You?



History of Parasite Control

1960's

- **Research at University of KY**
- **Introduction of Benzimidazole anthelmintics**
- **Recommendation - deworming every 8 weeks**

1970's and 1980's

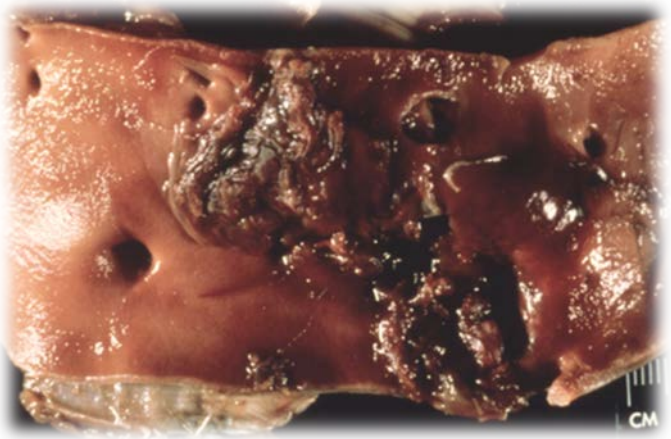
- **Development of ivermectin and other classes of dewormers**
- **Recommendation - rotate dewormers and deworm every 8 weeks**

Changes in Parasite Populations

- New dewormers produced important changes
- Large strongyles are now rare
- Small strongyles (cyasthostomes)are the parasites of concern in adult horses
- Ascarids remain the most important parasite in foals and weanlings.

Large Strongyles (Strongulus vulgaris)

- Main parasite of concern in adult horses, prior to the development of benzimidazoles and ivermectin.
- Highly pathogenic – can cause severe and fatal disease.
- Adults attach to intestinal lining; larvae migrate throughout horse's body for 6 months.
- Obstruct arteries that supply blood to the gut and cause arterial lesions and colic.



Small Strongyles (Cyathostomes)

- Present in all horses
- Are relatively mild pathogens
- Generally only migrate into the intestinal lining
- Only produce disease when the parasites are present at very high levels.
- Frequent deworming treatments are not needed to keep most adult horses healthy.

Parasite Anthelmintic Resistance

- The ability of parasites in a population to survive treatment with a dewormer.
- Resistance is an inherited trait that is passed to future worms.
- Rate of development is determined by the degree of selection pressure from repeated exposure to a dewormer and the extent to which surviving parasites pass their genes to the next generation.
- (It's not about will it happen but how quickly)
- Resistance occurs over time.
- With continued reproduction of resistant worms, eventually the resistant population is high enough that the dewormer fails.

Maintain Some Parasites in REFUGIA

- Refugia - That part of a population that is not exposed to selection pressure (in this case – not exposed to dewormers).
- Parasites cannot become resistant to a dewormer if they are not exposed to the dewormer.
- When are parasites "not" exposed to dewormers?
- Maintaining adequate parasite refugia (maintaining parasites that are not exposed to a dewormer) can reduce the rate of development of anthelmintic resistance.

Think About This……

1. You deworm “all” your horses with “Worm B Gone”
2. Most of the mature, egg-laying adults that can be killed by “Worm B Gone” are eliminated.
3. If resistance has developed - mature, egg-laying adults that developed resistance to the dewormer survive in the horse and continue to shed resistant eggs that may develop into resistant L_3 larvae.
4. As the horses graze, they will consume primarily resistant L_3 larvae. Worm B Gone no longer works.
5. What happens to the level of resistant larvae in the pastures if only high shedders are dewormed and not the low to moderate shedders?

REFUGIA RECAP

- Parasites in refugia maintain genes that can help dilute resistant genes that can develop in parasites exposed to a dewormer.
- Critical to maintain parasites in the pastures that have not developed genes that are resistant to dewormers.
- The goal is not to eliminate all parasites from pastures.

True or False?

Horses should be dewormed before rotating them into a clean pasture.

Anthelmintic Resistance Pattern for Small Strongyles

- **Benzimidazoles**: (Panacur, Safequard, Anthlecide) widespread resistance
- **Pyrantel**: (Strongid, Exodus, etc.) – developing resistance, some PA farms have significant resistance
- **Ivermectin** – (Eqvalan, Equimecterin, etc.) early signs of resistance
- **Moxidectin** – (Quest) - showing early signs of resistance

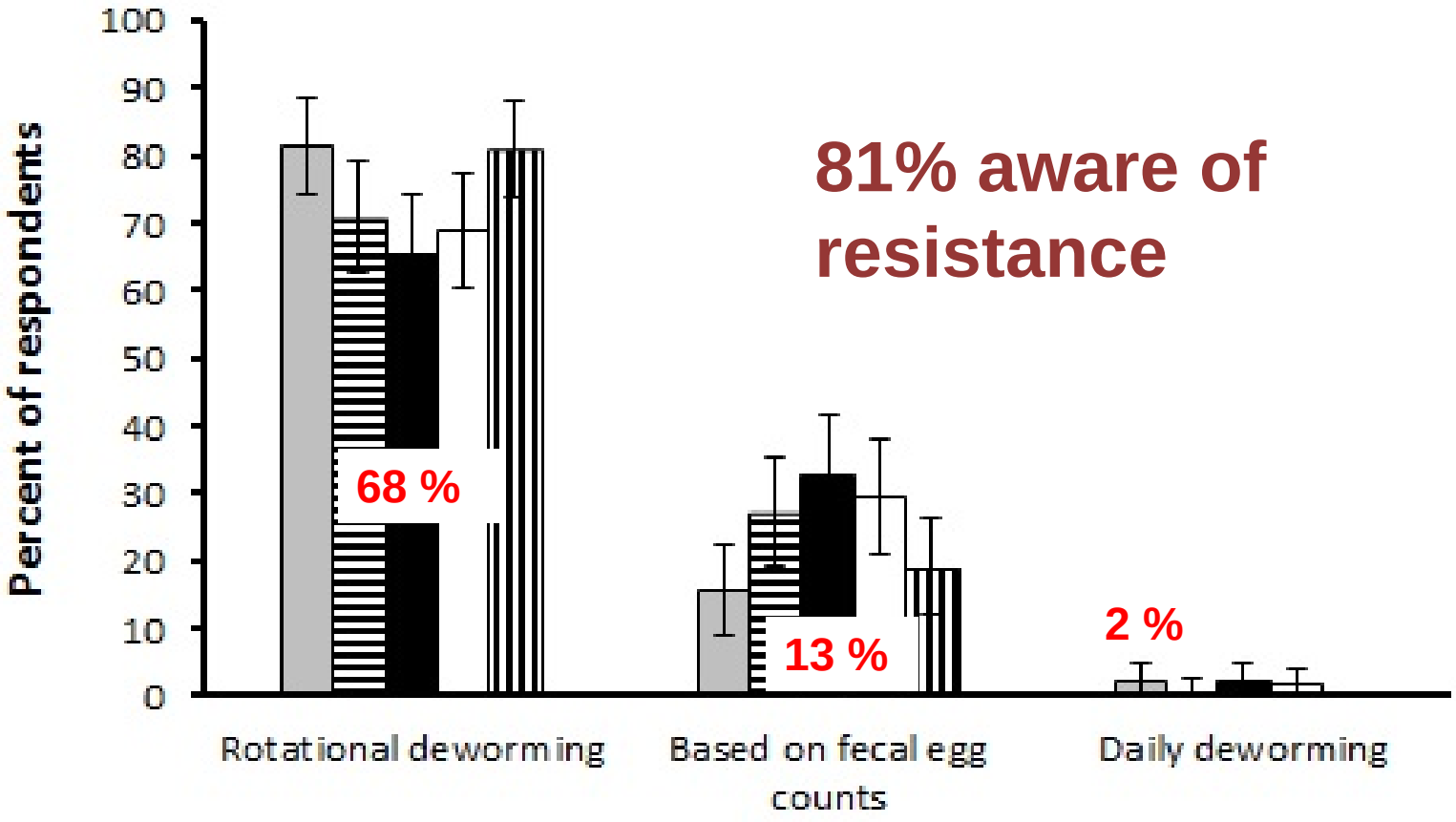
Product Resistance

2001-2002 Resistance Study based on 1274 horses on 44 large farms in 5 southern states

- **Fenbendazole - 97.7 %**
- **Oxibendazole - 53.5 %**
- **Pyrantel - 40.5 %**
- **Ivermectin - 0 %**

Prevalence of anthelmintic resistance cyathostomes on horse farms: Ray M. Kaplan, DVM, PhD Thomas Klei, PhD, Eugene Lyons, PhD, Guy Lester, DVM, Charles Courtney, DVM, Dennis French, DVM, Sharon Tollier, MS, Anand Vidashankar, PhD, Ying Zhao, MS

Current Practice on Thoroughbred Farms in Kentucky



81% aware of resistance

Robert et al., in press

The "New" Protocol in Parasite Management

**Use products with proven efficacy*

**Administer at the appropriate time of the year*

**Deworm based on the parasite burdens of individual horses*

The question you need to ask is what are you most afraid of – allowing your horses to retain some parasites or developing anthelmintic resistant parasites that can no longer be killed.

Next Module - Equine Parasites In The Environment

How to Reduce Parasite Numbers in the Environment Using Non-Chemical Management Strategies

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