Principles of Deworming

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Why do We Deworm?

• NAHMS data indicates 80% of cow calf operations use dewormers once a year
When I kill parasites, conception rates, weaning rates, carcass qualities, and feed efficiency, improve. It’s our number one technology, more so than anything else, from cow-calf operations to feedlot operations. I get my greatest bang for a dollar investing in killing parasites, because of their effect on feed intake.

Clinical Parasitism

- Diarrhea
- Anemia
- “Pot Bellied” Appearance
- Rough Hair Coats
- “Bottle Jaw”
Subclinical Parasitism

- Cattle appear healthy, but production is suboptimal
- Appetite suppression is the #1 economic impact of subclinical parasitism
- Evidence for induced immunosuppression
Sub-clinical Parasitism

- Poor Performance
- Decreased Milk Production
- Less Pounds of Beef to sell
- Decreased Fertility
- Greater Susceptibility To Other Diseases
When Do We Deworm
What is Strategic Deworming

• Deworming cattle with the intent to not only eliminate the parasites in the animal but also to reduce the parasites on pastures.
Strategic Deworming Requires

• Understanding the parasite and the dynamics of parasite populations
Dynamics of Parasite Populations

• Parasites have two basic functions:
  – Live off the animal they invade
  – Reproduce

• Reproductive goal: produce as many eggs as possible for maximal environmental contamination so their species survives
  – Seasonal survival and infection
Parasite Transmission

Eggs passed in dung and hatch

Adult Parasites

L1→L2→L3

Infected L3 larvae on grass
Seasonality of Parasites

- Parasites in cattle can arrest development so they are not producing eggs when environmental conditions are not favorable.
- In addition, egg development can be delayed.
Egg Development

• Highly dependant upon temperature and moisture
• Eggs passed in the middle of winter will not develop until warm weather in spring
• Eggs passed in the middle of summer or during drought may develop into effective larvae but can’t move away from pat
Egg Development (cont.)

- Eggs shed during the spring and early summer grazing season develop quickly with warmer temps and adequate moisture
Pasture Contamination

Winter Spring Summer Fall
Recommendations

• Cows & bulls
  – If only deworming one time a year, choose the spring time (March 15th)
  – If deworming in the fall do so before favorable parasite conditions return (September 1st)

• Calves
  – Sometimes at 200 – 250 lbs, sometimes not
  – Weaning
Miscellaneous

• Difference in dewormers
  – Classes
  – Pour-on vs. injectable vs. drench
  – Brand name vs. generics

• Parasite resistance
Dewormer Classes

- **Imidazoles** *(Levasole®)* - Levamisole; No L4 effect
- **Benzimidazole** – “the white drenches”
  - TBZ – Oldest, seldom used, no L4 efficacy
  - FBZ – Broad spectrum drench, paste, ‘feed through’, *(Safeguard & Panacur)*
  - ABZ – Broad spectrum + flukicide, *(Valbazen)*
  - OxFZ – Rumen injection, drench *(Synanthic)*
Macrocyclic Lactones

• Endoctocides: End – Ecto – Cide
• Avermectins (Ivomec, Dectomax, Eprinex)
  – Ivermectin: Injectable +/- clorsulon; Pour-on
  – Doramectin: Pour-on, Injectable
  – Eprinomectin: Pour-on, zero withdrawal, dairy OK
  – Generic
• Milbemycins (Cydectin) – Newest molecule
  – Moxidectin: Pour-on, Injectable, No withdrawal,
## Comparison

<table>
<thead>
<tr>
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<th>Pour-on’s</th>
<th>Injectables</th>
<th>Drenches</th>
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<tbody>
<tr>
<td><strong>Convenience</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td><strong>Cost (low to high)</strong></td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Product utilization</strong></td>
<td>3</td>
<td>1</td>
<td>2</td>
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<tr>
<td><strong>Spectrum of activity</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Residual activity</strong></td>
<td>1</td>
<td>2</td>
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Pour-on Tips

• Follow label directions
• Pour evenly from between the shoulders to the tail head
• DO NOT
  – Be in a hurry
  – Place product all in one area
  – Apply to the side of the animal
Generic ivermectin pour-ons

Yazwinski, T.A. et. al. 2004

Allocation of animals

• 42 head allocated to 6 treatment groups
• Blocked into 6, 7 head blocks based on EPG

Specifics

• 450 lb stocker calves
• 56 days study conducted from July – Sept & Sept – Nov
• All animals grazed same pasture

Ivomec Pour-On

Top Line

Ivercide

Cooper MEC

Ivermectin Pour-On

Control
Pour-on Ivermectins in 2004

Percent reductions of strongyle egg counts by treatment group at 14 and 56 days post-treatment (both study halves combined)
Average Daily Gain (lbs)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>ADG (lbs)</th>
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<tbody>
<tr>
<td>Ivomec</td>
<td>1.42</td>
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<tr>
<td>Top Line</td>
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<tr>
<td>CooperMec</td>
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<td>Ivercide</td>
<td>1.36</td>
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<td>Ivermectin PO</td>
<td>1.28</td>
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<tr>
<td>Control</td>
<td>1.3</td>
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Pounds per day

**Average Daily Gain**
Widespread resistance in cattle nematodes has been confirmed only in New Zealand, with cases also reported in South Africa, England and South America. The wake-up call concerning U.S. cattle occurred three years ago on a stocker operation in Wisconsin intensively grazing Southeast calves.

Is Your Dewormer WORKING?
What is Dewormer Resistance?

• Therapeutic failure of drug when administered at labeled dosage
• For practical purposes – failure of a previously effective product to control worms ≥90% when used at recommended dose rate
• A change in gene frequency in worm population
Development of Drug Resistance

Parents

Drug Treatment

Resistant

Susceptible

Next Generation
How’d this become a problem?

• Our current treatment strategy:
  – Current strategies exploit benefits of treatment and ignore resistance issues
  – Not dosing by BW leads to **Under-dosing**
    • Drug was spilled, Beyond expiration, or Stored improperly
  – We have over used anthelmintics
    • Therapeutic vs. prophylactic
  – We’re not monitoring efficacies
    • Are we using ineffective products?
When to Suspect Resistance

- Failure to gain weight
- Reduced feed conversion efficiency
- Scouring
- Poor reproductive performance
- Anemia & Poor immune responses
- When FEC remain high or clinical signs persist following treatment
  - Know prevalence of resistance in our area