IPM Plan for Internal Parasite Control in Small Ruminants

Steven M. Jones
Associate Professor – Animal Science
Integrated Parasite Management (IPM)

Goal is not to create parasite-free animals. It is normal for sheep and goats to have parasites. Goal is to prevent clinical disease and production losses.
Management Tools

- Evaluation and a Plan
- Sanitation
- Strategic Drug Use
- Forage Management and a Grazing Plan
- Record Keeping
Evaluation and a Plan

- Evaluate **YOUR** Farm
- Evaluate ALL Management
- Evaluate each Season
- Record Keeping and Production Records
- Target Problem Areas
- Be Flexible to Environmental Change
- Plan for Long Term Change

**If it Ain’t Working, Stop Doing It”**
Sanitation

- Good sanitation – common areas
- Feeders which prevent waste and contamination
Strategic Drug Use - Identify the Enemy

- Gastro-intestinal parasites, A.K.A. Worms, are the primary health problem affecting sheep and goats in warm, moist climates.
Life Cycle of GI Worms
Important Parasites of Small Ruminants

- **Abomasum:**
  - *Haemonchus contortus*
  - *Trichostrongylus axei*
  - *Teladorsagia (Ostertagia) circumcincta*

- **Small intestine:**
  - *Trichostrongylus colubriformis*
  - *Cooperia*
  - *Nematodirus*

- **Large intestine:**
  - *Oesophagostomum*
  - *Trichuris*
THE BARBER POLE WORM IS THE PARASITE OF PRIMARY CONCERN.

It Costs.
It kills.
Haemonchus contortus

- Common names: barber pole, wire worm, large stomach worm.

- Blood-sucking roundworm that pierces the mucosa of the abomasum, causing blood and protein loss to the host.

- It needs warm (60°F), moist conditions to complete its life cycle.

- Pasture is the primary mode of transmission.
  - It is estimated that 80% of the worm larvae is found in the first two inches of grazing vegetation.

- Young animals and highly stressed adults are most vulnerable to its effects.
Worms have become resistant* to most of the anthelmintics.

Only 3 drug families!
- Benzimidazoles
- Levamisoles
- Macrolytic Lactones

* Anthelmintic treatment fails to reduce worm egg count by 90%. Severe resistance exists when anthelmintic reduces egg count by less than 60%
## Anthelmintic Classes

<table>
<thead>
<tr>
<th>Chemical Family</th>
<th>Active Ingredients</th>
<th>Trade name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholinergic Inhibitors</td>
<td>Morantel</td>
<td>RUMATEL®</td>
</tr>
<tr>
<td></td>
<td>Levamisole</td>
<td>LEVAMISOLE®</td>
</tr>
<tr>
<td>benzimidazole or “White”</td>
<td>Albendazole</td>
<td>VALBAZEN®</td>
</tr>
<tr>
<td></td>
<td>Fenbendazole</td>
<td>PANACUR &amp; SAFEGUARD</td>
</tr>
<tr>
<td></td>
<td>Oxfendazole</td>
<td>SYNANTHIC®</td>
</tr>
<tr>
<td>Macrocyclic Lactone or “Endectocide”</td>
<td><strong>1. Avermectins</strong></td>
<td>IVOMEC® &amp; Generics</td>
</tr>
<tr>
<td></td>
<td>Ivermectin</td>
<td>DECTOMAX®</td>
</tr>
<tr>
<td></td>
<td>Doramectin</td>
<td>EPRINEX®</td>
</tr>
<tr>
<td></td>
<td>Eprinomectin</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>2. Milbemycins</strong></td>
<td>CYDECTIN®</td>
</tr>
<tr>
<td></td>
<td>Moxidectin</td>
<td></td>
</tr>
</tbody>
</table>
The Traditional Approach to Parasite Management

- Treated entire herd
- Dewormed by the calendar
- Rotated wormers regularly
- One Pasture
- Over crowding/grazing
- If multiple pastures, dewormed at move to new pasture
- Unknowingly purchased resistant worms
What Causes Resistance To Dewormers???

- Lack of Refugia
  - Refugia = the proportion of the worm population that is not selected by drug treatment
    - Worms in untreated animals
    - Eggs and larvae on pasture
  - Provides pool of sensitive genes
    - Dilutes resistant genes
  - Considered the most important factor in the development of drug resistance
Selective Treatment

- **FAMACHA©**
  - For *H. contortus* only
- For other GI worms
- **FEC**
- **Age**
- **Body condition**
- **Production level**
- **Symptoms**
- Short term weight gain
Minimizing Resistance

- Minimize number of dewormings
  - Treat based on need rather than convenience
  - Treat based on anemia
  - Deworm Strategically
  - Utilize Fecal Egg Count Assays

- Rotate class of drugs with care
  - Stay with same class of anthelmintic as long as drug is effective
Minimizing Resistance

- Utilize Grazing Management
  - Maintain forage greater than 3 inches
  - Provide areas of browse (brush, shrubs, small trees, etc.)
  - Maintain lower stocking rate
  - Graze sheep and goats with cattle, or in a rotation with cattle or horses
  - Provide tannin-rich forages, such as sericea lespedeza

- Harvest hay off pastures
Minimizing Resistance

- Worms are not equally distributed
  - 20-30% animals harbor 80% worms
- Identify animals that need less frequent treatment
- Keep them and breed them!
Forage Management and a Grazing Plan

- **Pasture Height** – 80% of the internal parasites found in bottom 2 inches of vegetation
- Rotational Grazing
- Cross – Fencing Necessity
Generally trying to move animals before the pasture is below 3 inches and get back in before pasture gets too mature
Forage Management and a Grazing Plan

Incorporate Taller Growing Forage Species:

<table>
<thead>
<tr>
<th>Cool - Season</th>
<th>Warm - Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryegrass</td>
<td>Pearl Millet</td>
</tr>
<tr>
<td>Rye</td>
<td>Bahia</td>
</tr>
<tr>
<td>Wheat</td>
<td>Crabgrass</td>
</tr>
<tr>
<td>Brassicas</td>
<td>Sereciea Lespedeza</td>
</tr>
<tr>
<td>Red/Crimson Clover</td>
<td>Native Grasses</td>
</tr>
</tbody>
</table>
Record Keeping

- 80% of Worms Eggs produced by 20% of your herd:
  - Famacha Test Herd & Record Scores
  - Cull your problems

- Select Replacements from Parasite Resistant Animals
“Resistant” Breeds
Some sheep and goat breeds are more resistant to worms.

**Sheep**
- Gulf Coast Native
- Hair sheep
  - Barbados Blackbelly
  - St. Croix
  - Katahdin
  - Dorper (?)
  - Royal White (?)

**Goats**
- Possibly –
  - Spanish/Brush
  - Myotonic/Tennessee
  - Pygmy
  - Kiko (?)

**NOT**
- Traditional wooled breeds

**NOT**
- Boer goats
- Dairy goats
- Angora goats
- Savanna???
“Resistant” Individuals

Parasite resistance varies between individual animals of the same breed type.

- 20-30 percent of flock shed most of the parasite eggs.

- Focusing deworming on susceptible animals will significantly reduce pasture contamination.

- BUT - Lactation and weaning are examples of environmental effects that render an animal more worm-susceptible.

- Culling worm-susceptible animals that have no environmental excuse for being “wormy” should increase flock resistance and reduce pasture contamination.
New “Tools”

- Copper Wire Particles
- Nematode-Trapping Fungus
- Proanthocyanidins (Tannins)
- Higher Protein Feeds
Summary

- Know your goals
- Know your animals
- Know your pastures
- Use ALL the Tools