Control of Helminth Parasites in Cow Calf Operations in the Southern United States

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What are helminths? Why are they important?

- Helminths are worms that live in the gastrointestinal tract or elsewhere in the body of cattle.
- Helminths may effect the normal functioning of the body so that the animal does not produce at its genetic potential.
- A few cattle will suffer disease (death), others do not grow, produce milk, or reproduce to their potential.
Numbers Count

Parasitic disease is a numbers game
A. A few = stimulate protective immune response
B. More = tolerated by most, economic loss in a few
C. Large numbers = clinical or economic loss

Different numbers for each parasite species
Different numbers for each class of cattle
Factors That Contribute to Economic Parasitism in Cattle

- Level of exposure by naïve cattle
- Age of cattle
- Breed and local environment
- Season of calving
- Age at weaning
- Source of cattle and parasites
- Quality and quantity of feedstuffs
Perceived Parasite Problem?

- Ill thriven cattle - ADR "ain't doen right"
- "Elevated" worm egg counts
- Lack of a "response" to anthelmintics
- Compare to similar animals under similar conditions
Are Liver Flukes Important?

- Only if your cattle have them
- Low numbers; Value of liver at slaughter
- Medium numbers; Lowered reproductive efficacy both heifers and bulls
- High numbers; Lowered feed efficacy, chronic poor doing cattle
Fasciola hepatica

Common Liver fluke
Liver Fluke Control

- Flukes require specific snails (live in vegetation filled low water areas) to complete the life cycle
- Fence off, drain snail habitats or only graze when snails are inactive (late summer)
- Treat cattle in autumn; drugs only effective 4 months or longer post infection
- Treatment is to protect snails
Lymnaed snail in habitat
Gastrointestinal Nematodes

- A related group of worms that live in the abomasum, small or large intestine
- Each species makes its living in a different way and does different things to the host
- All produce eggs which hatch in the fecal pat, and the larvae feed on bacteria, the larvae require one to two weeks to feed, molt and become infective
- Infective larvae leave the fecal pat in water and ascend vegetation where they are grazed
## Worm Characteristics

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<th>Worm</th>
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| **Ostertagia**| - Greatest economic importance  
- Throughout US except far south FL, TX  
- Arrested larvae  
- **Calves and adults affected** |
| **Cooperia**  | - Young calf pathogen if $\geq 20,000$ worms  
- Mature cattle resist infections  
- Tolerant of macrocyclic lactones Prolific egg-layer |
| **Haemonchus**| - Most prolific egg layer  
- Voracious blood feeder  
- Calf pathogen  
- Bahiagrass or Coastal bermuda grass developed for **Haemonchus** |
What about *Ostertagia*?

- Temperate parasite, active in pastures late October until May in gulf coast
- Not present far south Texas, south of lake Okeechobee?
- Survives summer as arrested larvae in stomach glands
Why Is *Ostertagia* Important?

- More damaging to Brahman type cattle
- May cause disease in cows as well as calves
- *Ostertagia* summer in the abomasal glands as inactive arrested larvae
- Larvae are programmed to arrest by environmental clues
- Larvae emerge from arrest in the autumn
- Emergence of larvae causes damage to the abomasum
Ostertagia ostertagi

Small larvae (L4) deep in glands, Larger (adult worm) emerge from glands

Infected gland

Normal gland
Ostertagia What Happens

- Abomasal edema
- Proliferation of bacteria in the abomasum
- Fermentation in the small intestine
- Fluid pulled into gut resulting in diarrhea
- Dehydration
- Primary digestion decreased
- Anorexia
- Depressed immunity
Which pasture has the most grass? Which animals had more worms?
**Haemonchus spp**

- An important parasitic helminth of calves in tropical climates i.e. Florida April through November
- Older cattle become resistant to and/or tolerant of infection
- **Voracious blood sucker:** causes anemia and hypoproteinemia, may exsanguinate calves
- Extremely fecund 5,000 to 6,000 eggs/female/day
- Problem on high intensity summer grazing systems
Adult *Haemonchus* in Abomasum
Who is *Cooperia*?
small intestinal parasite

- Eggs passed in the feces of cattle less than a year of age are predominantly *Cooperia*
- Stimulate early resistance by calf to infection
- Causes disease in calves (diarrhea) if 20,000 or more worms in the small intestine
- May be resistant to macrocyclic lactones
- Importance? Dairy calves, light weight stocker calves; probably so!
  Others; probably not!
Cooperia spp

Small intestine calves
Why use Anthelmintics? (drugs that kill worms)
Who do we treat?

**Why**
1) To save lives
2) To increase profits
3) To protect pastures

**Who**
1) Those cattle which contribute most to pasture contamination
2) Suffering from disease
How Often Should I Deworm My Cattle?

- **Where do you live?**
  - South: late spring early summer
  - Kill arrested *Ostertagia*, the most important parasite, before it causes damage
  - Aid in getting through a period of adverse conditions i.e. entering winter

- **What is the stocking density?**
  - The higher the density, the higher the exposure
Geography Climate Parasites

- High rainfall (>32 inches) annual rainfall: parasites
- Low to medium (>16 inches): few parasites
- Very low rainfall: depends on range, few if any
Stocking Rate / Density
Who Should I Deworm?

- **Cows or calves?**
- **Cows;** As geography and management dictate
- **Calves;** When you treat cows if more than 200 lbs and at weaning
- **First calf heifers and bulls if nothing else in herd**
Does It Matter Injectable, Pour-on, or Oral?

- Injectable: long residual effects, injection site reaction
- Pour-on: quick easy, must be absorbed
- Oral: drench or feed, adequate dose for each animal

- The most effective is the method that gets the proper dose to the target worm with the least stress on the cattle and the owner
What About Generic Dewormers?

- Injectable or oral; similar
- Pour-on; Same drug / different carrier
- Most generic pour-on do not have the efficacy as original formulation
- Do you buy dewormers from the same folks that make protein enhanced dog food, flavor enhanced toothpaste or children's formula?
Should We Rotate Dewormers?

- Not unless we are after different worms
- Rotation of dewormers does not slow down the onset of resistance of worms to the products used
- Rotation of drugs is logical but research studies indicate that resistance occurs to all the drugs in the rotation used during a grazing year faster than if drugs are changed as they fail
Should The Drug Differ for Cows and Calves?

- When calves are suckling the same products should serve both
- At weaning; calves have *Cooperia* rare in cows
- A white drench (benzimidazole) a better choice for *Cooperia*, not most other worms
Do Anthelmintics Always Work In Cattle?

- *Cooperia punctata*, primary culprit for resistance in calves
  - Economic importance?
  - Calf just needs to get older

- *Haemonchus* populations resistant to both macrolides and benzimidazoles on intensely grazed permanent pastures by naïve calves

- Resistance undocumented in cow calf herds in North America
What is the Best Dewormer?

- The one that works on your ranch against your worms in your cattle
- University professors, drug company sales reps, feed store managers, county agents, neighboring ranchers or internet blogs don’t have a clue!
How Do We Know if an Anthelmintic Works on a Farm

- Treat some animals don't treat others; slaughter and look for worms in the GI tract 1 to 2 weeks later.
- Determine if there are worm eggs present prior to treatment and then compare the number of eggs present 2 to 4 weeks later; Fecal Egg Reduction Test.
Fecal Egg Reduction Test (FERT)

- An indicator of efficacy
- Best done in younger cattle
- Mean difference of fecal egg counts in a population at treatment and 2 to 4 weeks later
- Uneven distribution of egg counts – 20% of herd has 80% of eggs
- 20 individual fecal samples at random or 10 individually identified samples
- Identify the genera of worms both before and after treatment
Evaluation of Worm Numbers
Fecal Egg Counts

- Somewhat linear correlation between level of infection by **adult worms** and egg count
- Species vary in fecundity
  - A few *Haemonchus* produce more eggs than an abomasum full of *Ostertagia*
- Some worms damage host as larvae others as adults
- Larvae don't produce eggs
When Should Fecal Egg Counts be Performed?

- More than a month following the onset of grazing in pasture by at risk animals so the parasites picked up early will be reproducing adult worms
- When cattle appear to have possible nematode associated disease
- At the time of anthelmintic treatment and again in two to four weeks to estimate drug efficacy
Worm Eggs that Look the Same

Cooperia
Haemonchus
Oesophagostomum
Ostertagia
Trichostrongylus
How Do We Differentiate Among Worm Eggs?

- Geography, time of year and class of cattle will give you an idea of which parasite species are there.
- Larvae hatch from eggs develop to the infective stage, infective larvae may be differentiated.
- Genetic testing sensitive but limited laboratory availability.