Parasite Prevention & Management in Goats

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4-H Educational Event
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Outline

• Introduction
• Parasites
• Prevention
• Assessment
• Treatments
• Do a FEC

Key Points of Parasite Control

• Parasite infection is normal in goats
• The number of worms found in individual animals varies, with essentially all animals having some worms and coccidia
• It is rare to find uninfected goats
• 20% of the goats shed 80% of the parasites

• The goal is not to eradicate worms, but to reduce their adverse effects in practical and economical ways
• The interaction between parasites, the environment, animals, and management decisions is complex
• Drug resistance is a serious challenge to effective parasite control
Barberpole Worm

**Haemonchus**
- Anemia
- Death common

Coccidia
- Diarrhea, eventually bloody
- Reduced weight gain, lethargic
- Deadly to young goats
- Adults carry, not affected

Bankrupt Worm

**Trichostrongylus**
- Watery diarrhea, adult
- Slowed Growth

Nodular Worm

**Oesophagostomum**
- Diarrhea
- Slowed Growth

Brown Stomach Worm

**Ostertagia**
- Suppresses appetite
- Weight loss
- Poor body condition

Strongyloides
- Diarrhea in young
- Deadly
  — Young raised on sawdust
**Tapeworm**
- Blocks small intestines in kids
- Loss of nutrients

**Lungworm**
- Cough
- Reduced appetite and milk production

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**Brain Worm & Liver Fluke**

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**Food Up/Off Ground**

Images courtesy of Dr. David Thomas, UW-Madison, Sheep Production and Management 430, Spring Semester 2013
Immunity

- Develops with advancing age and parasite exposure
  - Not until >4 months of age, depending upon breed and nematode species
- Preventive anthelmintic treatments interfere with the development of immunity
- Adults are generally immune to parasites, but under stress can break down
- Goats show the weakest degree of immunity of any livestock

Periparturient egg rise

Relaxation of immunity around the time of parturition

- Lasts for about 4 weeks
- May occur earlier (in pregnancy) if animals are underfed or under stress
- Primary source of infection for new crop of lambs and kids
- Cause (?) Hypothesis:
  - Lactation after pregnancy
    - Increasing prolactin levels
    - Reduction in IgA antibodies associated with transfer of maternal antibodies in colostrum

“Spring” periparturient egg rise

- If kidding occurs in the spring, it will coincide with the maturation and egg production from previously arrested worm larvae
- Management strategies
  1. Deworm all females prior to parturition with an anthelmintic that is effective against hypobiotic larvae
  2. Increase protein level of ration during late gestation
  3. Selective deworming using FAMACHA© system and Five Point Check©

Pasture and grazing management

The “cornerstone” of effective parasite control

- Clean or safe pastures
- Pasture rest/rotation
- Stocking rates
- Alternative forages
- Browsing
- Plant height
- Plant morphology
- Plant moisture
- Mixed species grazing
**Alternative forages**

- Forages containing condensed tannins and sesquiterpene lactones.
  - Sericea lespedeza
  - Chicory
  - Birdsfoot trefoil
  - *Artemisia* spp.

  How do they work (?) – reduce egg hatch and development of larvae.

**Sericea lespedeza**

*Lespedeza cuneata* (high tannin variety)

- Warm season legume that grows in acidic soils with low fertility and is tolerant of drought
- Goats readily eat
  - Sheep will eat
- For control of barber pole worm only
- Effective when consumed as
  - Fresh forage
  - Loose or ground hay
  - Pelleted supplement

**Browsing**

- Goats that are allowed to browse (their natural grazing behavior) have fewer parasite problems
- Browse should be managed to provide continuous nutrition for goats

**Plant morphology**

- There are lower numbers of larvae on non-grass plants, e.g. legumes, forbs
- Non-grass plants reduce parasite survival on pasture or reduce larval migration up plant
- Management strategies
  - Include legumes in pasture mixes (e.g. 30%)
  - Plant alternative forages
**Plant moisture**
- Delay grazing until after dew has lifted or the grass has dried after a rain
- Dry conditions force the larvae to stay at the base of the plant
  - Parasites need moisture!

**Mixed or multi-species grazing**
- Parasites are mostly host-specific
  - Worms rarely transmit from one species to another
  - Cattle and horses have different parasites than sheep and goats
- Complementary grazing habits
  - Goats → browse
  - Sheep → forbs
  - Cattle → grass
  - Horses → grass

**Nutrition**
There is an interaction between parasites and nutrition
- Livestock are far more capable of coping with parasites if their nutritional needs are being met
- Animals on low protein diets are more susceptible to infection because they produce less IgA

**Management options**
- Sanitation
- Biosecurity
- Zero grazing
- Timing of lambing and kidding
- Weaning age
Sanitation

- Dry, well-bedded pens
- Clean floors and surfaces
- Feeders which prevent contamination and wastage.
  - Do not feed on ground.
- Clean water that is free from fecal material.
- Discourage congregation on pasture.

Biosecurity

Don’t introduce drug-resistant worms to your farm

- Quarantine new animals for 30 days
  - In a pen away from rest of flock/herd.
  - No fence line contact
  - Deworm with anthelmintics from 2-3 drug chemistries, e.g.
    - Cydectin® + levamisole
    - Valbazen® + Ivomec® + levamisole

Zero grazing

confinement, dry lot, feed lot, elevated floors

- Can maintain animals relatively “worm-free” under zero grazing conditions
  - Coccidiosis is still a risk
- Primary source of infection (and re-infection) is removed: grazing
- Pens should be kept dry
- Feeders and waterers need to be kept clean
  - No feeding on pen floor or ground

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Assessment

1. FAMACHA
2. Body Condition Score (BCS)
3. Fecal Egg Count (FEC), diarrhea
4. Hair Coat
5. Bottlejaw
6. Unusual behavior

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Anthelmintic resistance . . . is inevitable!

• Is widespread and well-documented (especially in southeastern U.S.)
• Varies by species, geographic location, and individual farm
• Is affected by past deworming and grazing practices
• No treatment is 100% effective.
% farms with anthelmintic resistance

<table>
<thead>
<tr>
<th>Anthelmintic</th>
<th>Mid-Atlantic (n=33)</th>
<th>Southern (n=46)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzimidazole</td>
<td>100%</td>
<td>80%</td>
</tr>
<tr>
<td>Ivermectin</td>
<td>100%</td>
<td>80%</td>
</tr>
<tr>
<td>Cydectin</td>
<td>80%</td>
<td>80%</td>
</tr>
<tr>
<td>Levamisole</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>


Practices which accelerate drug resistance

1) **FREQUENT DEWORMING**
2) Underdosing
3) Injecting dewormers
4) Pouring on dewormers
5) Feeding dewormers
6) “Persistent activity” dewormers
7) Putting dewormer in mouth
8) Dosing on full stomach
9) Deworming when infection levels (in animal and on pasture) are low
10) Putting treated animals on clean pastures
11) Treating everyone
12) Improper use and storage of dewormers

How effective are your dewormers?

- **95-100% effective. Small number of resistant worms may be present.**
- **80-95% effective. Treatment is effective, but resistance is increasing.**
- **Less than 80%. Production losses become apparent as effectiveness of dewormer moves closer to zero.**
- **Anthelmintic failure. Animals die.**

Targeted selective treatment (TST)

- **Identifies those animals which require treatment**
- **Identifies which animals would benefit from treatment**

Adapted from: Wormer Resistance: The need for change. Meat Promotion Wales.
Targeted selective treatment (TST)

• For TST to be viable, there must be practical tool(s) that producers can use to make deworming decisions

• The first tool developed was the FAMACHA© system

• The Five Point Check© is an extension of the FAMACHA system

• Doing your own fecal egg counts (FECs) for FECRT

Alternative Dewormers

• COWP
• COWP plus chemicals
• Tannin drenches, supplements
• Anthelmintic plants

Which Dewormer to Use?

<table>
<thead>
<tr>
<th>Dewormer Category</th>
<th>Dewormer Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAMACHA® 3 - Low risk</td>
<td>Less effective dewormer</td>
</tr>
<tr>
<td>Quarantine drench</td>
<td>Albenza + moxidectin + levamisole (Valbazen® + Cydectin® + Prohibit®)</td>
</tr>
<tr>
<td>Tapeworms</td>
<td>Fenbendazole or Albenza or Albendazole (SafeGuard® or Valbazen®)</td>
</tr>
<tr>
<td>Liver fluke</td>
<td>Albenza (Valbazen®)</td>
</tr>
<tr>
<td>Meningeal worm</td>
<td>Fenbendazole + ivermectin (SafeGuard® + Ivermectin®)</td>
</tr>
<tr>
<td>Nasal bots and other external parasites</td>
<td>Ivermectin (Ivomec® drench)</td>
</tr>
</tbody>
</table>

FAMACHA®

- 4 or 5: Most effective dewormer
- 3: High risk dewormer
- 2: Low risk dewormer

Quarantine drench

- Albendazole + moxidectin + levamisole (Valbazen® + Cydectin® + Prohibit®)

Tapeworms

- Fenbendazole or Albenza or Albendazole (SafeGuard® or Valbazen®)

Note: Tapeworms tend to be non-pathogenic and there is no evidence to suggest a treatment benefit (sheep).
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Fecal Egg Count Procedure

• Supplies

Feces in strainer above dish
Add float solution
Mash and mix 2 min
Strain chunks
Fecal Egg Count Procedure

**Stir 8 times**
**Suck up fluid**
**Fill 1 chamber**
**Stir 8 times**
**Suck up fluid**
**Fill 2nd chamber**

Place slide on microscope
100X (10X objective and 10X ocular)
Start at one corner of grid
Count eggs by type

**Calculate eggs per gram (EPG)**

\[
\text{EPG} = \left( \frac{\text{# eggs in left chamber} + \text{# eggs in right chamber}}{\text{total eggs}} \right) \times 50
\]

**Example calculation - dry feces**

\[
\text{# eggs in left chamber} = 24
\]
\[
\text{# eggs in right chamber} = 20
\]
\[
\text{total eggs} = 44
\]
\[
44 \times 50 = 2,200 \text{ EPG}
\]

*This dot should be censored.*

http://www2.luresext.edu/goats/library/fec.html
Fecal Egg Count Procedure

Deworming Recommendations
(for the barber pole worm, Haemonchus contortus):

- Bucks & dry does ≥ 2,000 EPG
- Lactating dairy does ≥ 750 EPG
- All other animals ≥ 1,000 EPG

For coccidia, deworm if clinical (diarrhea)

http://www2.luresext.edu/goats/library/fec.html

Fecal Egg Count Procedure

Questions?

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Photo by Campbell