# Goat and Sheep Parasite Management

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Some slides and most pics from Susan Schoenian, University of Maryland Extension

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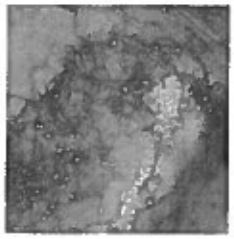
## Internal parasites

- **Goats (especially)** and sheep can die quickly from internal parasites (mostly "gut" worms)!
- Worms are rapidly becoming resistant ('immune') to dewormers
- If one animal has worms resistant to dewormers, the whole farm has them.
- We need to use every method we can to control worms not just dewormers alone

Resource: www.wormx.info

## Worst (for sheep and goats): Barberpole worm (*Haemonchus contortus*)



- Sucks blood – can kill goats and sheep quickly (sometimes with few outwards signs)
- Causes anemia (via blood loss)
- Do not normally cause scours/diarrhea
- May cause weight loss (via loss of energy/appetite)

## Barberpole worm Symptoms

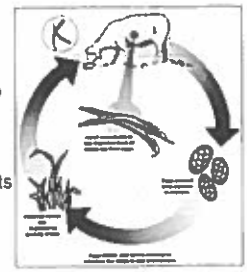
Pale eyelids (mucous membrane), bottle jaw

Lower appetite when no energy, so maybe weight loss and lower milk production if not eating; if combination infection with other worms, weight loss, diarrhea (dehydration), poor hair coat, lower milk production/kid growth, poor breeding/kidding rates

Slow walking, laying down a lot, no energy, will not get up

## Barberpole worm life cycle

- Eggs hatch and grow inside manure to the infective stage larvae (L3) which comes out of the manure and can migrate up grass in dew drops/water.
- Goats/sheep eat the grass with the L3 on it in the stomach, the L3 mature (L4 and then to adults – both suck blood).
- Adult worms lay eggs and the eggs exit the animal in feces.



Note: The adults do NOT attach to the gut, they scratch the wall and drink the blood from the scratch

## Barberpole worm life cycle

- The L4 can go into a dormant ("sleeping") state and survive in the animal a long time, even with no reinfection, can see adults in animals 3-6 months later; the L3 outside on the pastures have a tough sheath ("skin") and can live a long time (up to 6 months in perfect conditions).
- They like to develop in warm (above 60 degrees F) and moist weather; pastures have lower worm problems in very cold and very hot/dry periods.
- BUT – can overwinter in the animal (since can stay alive in animal and on pasture a long time)

## Other small ruminant worms

Stomach and intestinal – scours, weight loss, poor doers, lower milk production

- *Trichostryonglus spp* (Hair worm, others)
- *Nemtodirus* (Thin-necked int. worm
- *Oesophagostomum* (Nodular worm)
- *Trichuris* (Whip worm)
- *Ostertagia/Teledorsagia* (Brown stomach worm)
- *Bunostomum* (hookworms, diff species than dogs)

- Tape worms (only ones can "see" in feces)
  - White drenches at higher doses (Rx)
  - Ruminants may complete life cycle for dog tapeworm

Others: liver fluke
Not really in our area

Deer worm – Meningeal worm!

Note: A valid vet-client relationship is needed for a vet to give permission to use drugs extra label.

*Some resistance has been found in tapeworms to white drenches ("dazzles"); praziquantel has been used successfully (found in some horse dewormers); work with your vet

## "Whole farm" approach to parasite management

- Understand parasites
- Manage animals for their problem level
- Create clean or safe pastures
- Consider multi-species grazing
- Use pasture rest and rotation
- Consider alternative forages
- Understand the role of nutrition
- Could use zero grazing
- Use genetic selection
- Manage refugia (worms that will die when treated)
- Use multiple measures of worm infection to decide which to deworm

## Who gets worms easiest?

**Most likely to get worms (more susceptible)**

- **Just weaned up to yearlings**
- Orphans/bottle babies
- Late-born (in worm season)
- High-producing females
- **Just before/after giving birth**
- Thin animals
- Geriatric animals
- Stressed/sick animals
- Some breeds/not adapted

**Less likely (more resistant)**

- Mature (adults)
- Dry (not milking), open or early pregnant
- Pets ("babied"/well fed)
- Ones in good body condition (fat)
- Some breeds or adapted/selected animals

## Management

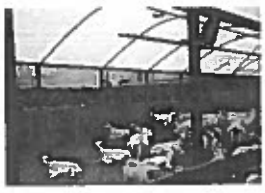
- Clean areas, especially where eat; use feeders
- Clean water
- Avoid overgrazing
- Do not graze below 4 inches (6+" best)/ balance height for nutrition (rotate based on height)
- Time birthing to minimize parasite infections
- Stocking rate 3-5 adults per acre of good forage

## Management

- Browse when possible (rotate); 80% larvae in first 2 inches of grass
- Cut/carry browse or un-grazing forages
- New pastures are 'clean' (winter or summer annuals?)
- Multi-species grazing (i.e. cattle/horses)
- High tannin forages

## Management

- Higher (30% more) than required protein reduces parasitism
- Keep body condition up (helps them fight off worms)
- Consider zero grazing for no worm exposure (dry lot, confinement), but control coccidia



## Genetic selection

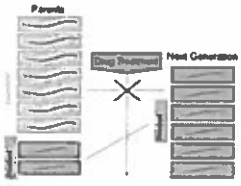
- Breeds vary in their resistance to gastro-intestinal parasites
  - Resistant breeds: Spanish, Myotonic, Kiko, St Croix, Katahdin, Blackbelly, Texel (in research)
- BUT there is as much difference within breeds ("lines" of animals) as between breeds
  - 70-80% of the eggs shed onto pasture come from 20-30% of the animals
  - **Parasite traits are moderately heritable (inherited); you can select for it**
  - Research: selection for parasite resistance did not negatively impact growth of lambs or fertility of ewes
- Resistance (best)
  - Ability of host to resist infection
  - Measured by fecal egg counts
- Resilience
  - Ability of host to withstand challenge and/or infection

Genetic tools such as EBVs for fecal egg counts are available

## Slow down worm immunity

**Refugia are worms that have not been exposed to deworming treatment.**

- Do not deworm on a regular schedule.
- Do not deworm all animals in a group
- Do not return treated animals to a clean pasture.
- Give all anthelmintics orally at the proper dose (2x labeled dose for goats; talk to vet though).
- Do not under-dose.
- Deworm new animals with anthelmintics from at all three classes of dewormer (one after the other), make sure FEC goes to 0 epg.
- New information presented at wormx.info is that using more than one dewormer class every time you deworm can slow down resistance.




Without refugia, all worms will eventually be resistant to all anthelmintics.

**The goal is to breed worms on your farm so they have genes that make them die when you deworm them.**

## How do we decide who to deworm?

Can use the FAMACHA© eyelid color scoring system to estimate anemia in sheep and goats (Barberpole, liver fluke?, coccidia? diseases?)

| | Eye lid color | Packed cell volume | Treatment recommendation | |
|---|---|---|---|---|
| 1 | Red | ≥ 28 | Optimal | No |
| 2 | Red-Pink | 23-27 | Acceptable | No |
| 3 | Pink | 18-22 | Borderline | ? |
| 4 | Pink-White | 13-17 | Dangerous | Yes |
| 5 | White | ≤ 12 | Fatal | Yes |

Check both eyes (use worse score); check in natural light; get a second card and throw away faded one; check susceptible animals every 2-4 weeks in worm season; use 5 point check, not just FAMACHA to deworm; sell/remove from breeding those that often need deworming; video: http://web.uri.edu/sheepngoat/video/

## Not just FAMACHA

- Body condition (BCS; scoring system, 1 to 5, videos available online)
- Dag score (poopy butt?)
- Hair coat (poor or slick/shiny)

BCS Score: 1 2 3 4 5

Note: scores for dairy may be 0.5 to 1 score higher than form meat animals

## Bottle jaw

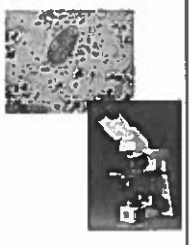
**Sub-mandibular edema**
**If have it, deworm!**

Note: Nutritional/disease issues can also cause bottle jaw (i.e. starvation, Johnes, CAE-when wasting).

## Fecal egg counts

**eggs per gram of feces**

- Indicate "potential" parasite burden in animal.
- Indicate potential parasite problems on the pasture.
- Use to determine if dewormers still work (fecal egg count reduction test).
- Use to determine genetic differences (who to breed or who to sell).



Video at: http://web.uri.edu/sheepngoat/video/
Detailed directions available from: whitleyn@fvsu.edu

## Fecal egg counts-what do they mean?

| Livestock species | Worm species | Clinical significance* |
|---|---|---|
| Sheep | *Haemonchus contortus* | 2,000+ epg clinically significant |
| Sheep | *Teladorsagia* spp. | 500+ epg clinically significant<br>Disease can occur with lower FECs |
| Sheep | *Trichostrongylus* spp. | 500-2,000 epg |
| Sheep | *Nematodirus* spp. | 500-2,000 heavy infections<br>light infections 50-300 epg |
| Sheep | *Oesophagostomum* | 500-1000 epg heavy infections |
| Sheep | *Moniezia* spp. | Variable numbers<br>Questionable importance |
| Cattle | *Ostertagia* spp. | 300+ clinically significant<br>Disease can occur with lower FECs |
| Cattle | *Haemonchus placei* | 700-1,500 epg may be clinically significant |
| Cattle | *Nematodirus* | Rare |
| Cattle | *Cooperia* spp. | 1,000-5,000 |
| Cattle | *Bunostomum* | 100-500 epg may cause ill thrift |

*Also need to consider nutritional and physiological status and age of animal.

## Three drug classes (in US)

**Look for the DRUG name on the label, not the name brand**

1) **Benzimidazoles**
   Chemical name ends in "..dazole"
   Fenbendazole, Albendazole, Oxybendazole
2) **Nicotinics**
   Levamisole, Morantel, Pyrantel
3) **Macrocyclic lactones,**
   Chemical name ends in "-ectin"
   a) Avermectins
      Ivermectin, Doramectin, Eprinomectin
   b) Milbemycins
      Moxidectin

*Valbazen should not be used in pregnant animals (check label); do not rotate! If only using single dewormers, use one until no longer works – **current information indicates using multiple classes at a time helps hold off resistance longer.**

## Deworming

- Works best if given orally and, FOR GOATS, at around twice (2 x) the labeled dose (except Prohibit/Leva-Med – see www.wormx.info goat deworming chart).
- Use sheep products first, then cattle or horse
- Using pour-ons as a drench at high doses and long-term can poison the animal causing liver damage
- Consult your vet if the dewormer you want to use is not labeled for your animal species or if you are using more than the labeled dose - **Veterinary prescriptions are needed to use drugs off- or extra-label**

## Deworming

- **For animals that are weak and have a bad FAMACHA score:**
  - **Take off pasture (so they do not get re-infected)**
  - **House with (or beside) another animal to reduce stress**
  - **Feed high protein, good quality feed/hay and clean water (move everything close to them if they cannot get up; prop them up on sternum)**
- **Supportive therapy may also be needed for weak FAMACHA 4 and 5 animals. Work with your vet. Possible ideas (nothing proven):**
  - Iron (oral like Red Cell or injectable)
  - Vitamin K (help with blood clotting)
  - Electrolytes (for dehydration), can use Gatorade/Pedialyte type drinks to drench them if no electrolytes available
  - Oral liquid energy supplements (if off feed), examples: karo syrup; propylene glycol; nutrient drenches

## Keep your dewormers working

- Weigh animals to determine proper dose (guess a little HIGH; weigh heaviest).
- Do not under-dose.
- Use proper oral dosing (drench) technique – give on top of tongue at the back of the mouth; make sure they swallow it.
- Fast animals (no food overnight?) before treatment.
- Give multiple anthelmintics (with vet input)
  - Often they work together even if they do not work when given alone
- Manage for refugia

**Store dewormers at proper temperature, mix them up properly (levamisole; read label carefully) and abide by expiration dates!**

## How do you know if you have dewormer resistance (immunity) on your farm?

**1) DrenchRite® - UGA Larval Development Assay**

- An *in vitro* test for the detection of resistance to all anthelmintic groups.
  - Need pooled FRESH fecal sample from 10 or more 'wormy' animals (minimum of 6); at least ≥ 350 epg, ≥500 epg preferred
    - Animals with FAMACHA© scores of 3, 4, or 5 are more likely to have higher egg counts if barber pole worm is the primary parasite.

**2) Fecal Egg Count Reduction Test (FECRT)**

- Comparison of before and 10 days after fecal egg counts (can check 14 days after macrocyclic lactones)
- May include "control" (untreated) animals in testing
- Should have at least 150 epg at deworming
- 10 per group best; can get some information with a pooled fecal sample (pool all from each separate group)
- All fecals must be fresh!

## The future of parasite control

Natural/alternative dewormers – support, not replace chemical dewormers

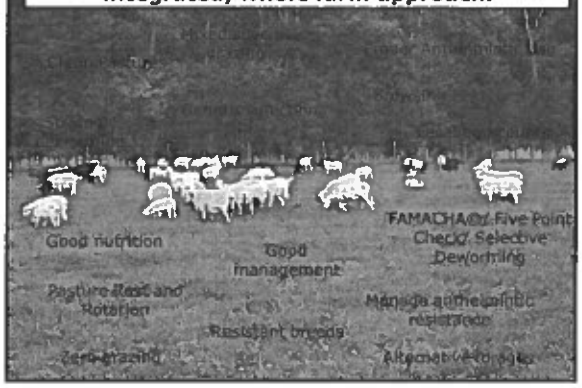
**"natural" anthelmintics?**

- Copper oxide wire particles
- Sericea lespedeza ( ↓FEC/coccidia)
- Pine bark (↓ FEC??)
- Fungus (reduces reinfection)
- Copper sulfate (? – toxic)
- ✖ Garlic
- ✖ Pumpkin seed (variable)
- ✖ Diatomaceous earth
- ✖ Commercial herbal dewormers
- Others? Replace worms?

- Vaccine development
  - Is a vaccine in other countries (does not really prevent, kills those there)
  - Will not be available in U S ?
- New anthelmintics
  - Zolvix®
    Monepantel
  - Startect®
    derquantel + abamectin
  - LongRange ®? (eprinomectin, not new just new formulation, not recommended to use in sheep and goats)
- EBVs/DNA tests

Sheep are sensitive to copper, so care should be taken if using copper-based treatments. More information, www.wormx.info and https://attra.ncat.org/attra-pub/summaries/summary.php?pub=216

## Parasite control requires an integrated/whole farm approach.




## Questions?