

— February 26, 2019 —

Managing Internal Parasites: Attack The Enemy



— Presented by —

Linda Coffey

NCAT/ATTRA

— Hosted by —

FACT

Food Animal Concerns Trust



ATTRA
SUSTAINABLE AGRICULTURE

Introductions

- **Food Animal Concerns Trust (FACT)** is a national nonprofit organization that advocates for the safe and humane production of meat, milk, and eggs.
- **Larissa McKenna**
Humane Farming Program Director
Email: lmckenna@foodanimalconcerns.org
Website: foodanimalconcernstrust.org/farmer
- **FACT's services** for livestock and poultry farmers include:
 - Fund-a-Farmer Grants
 - Conference scholarships
 - Free webinars
 - Humane Farming Mentorship Program



Introductions

- **National Center for Appropriate Technology (NCAT)** is a national nonprofit organization that advocates for small-scale, local, and sustainable solutions to reduce poverty, promote healthy communities, and protect natural resources.
- **Linda Coffey**
Agriculture Specialist
Email: lindac@ncat.org
Website: www.attra.ncat.org
- **NCAT manages** the ATTRA information service for farmers:
 - Free technical advice: 800-346-9140
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Our Presenter



Linda Coffey

NCAT/ATTRA and Maple Gorge Farm
Prairie Grove, Arkansas



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- Dr. Jean Marie Luginbuhl,
- Dr. Ray Kaplan, Dr. Tom Terrill,
- and the rest of the American Consortium for Small Ruminant Parasite Control (ACSRPC).

We all benefit from their work, see: wormx.info



American Consortium for Small Ruminant Parasite Control

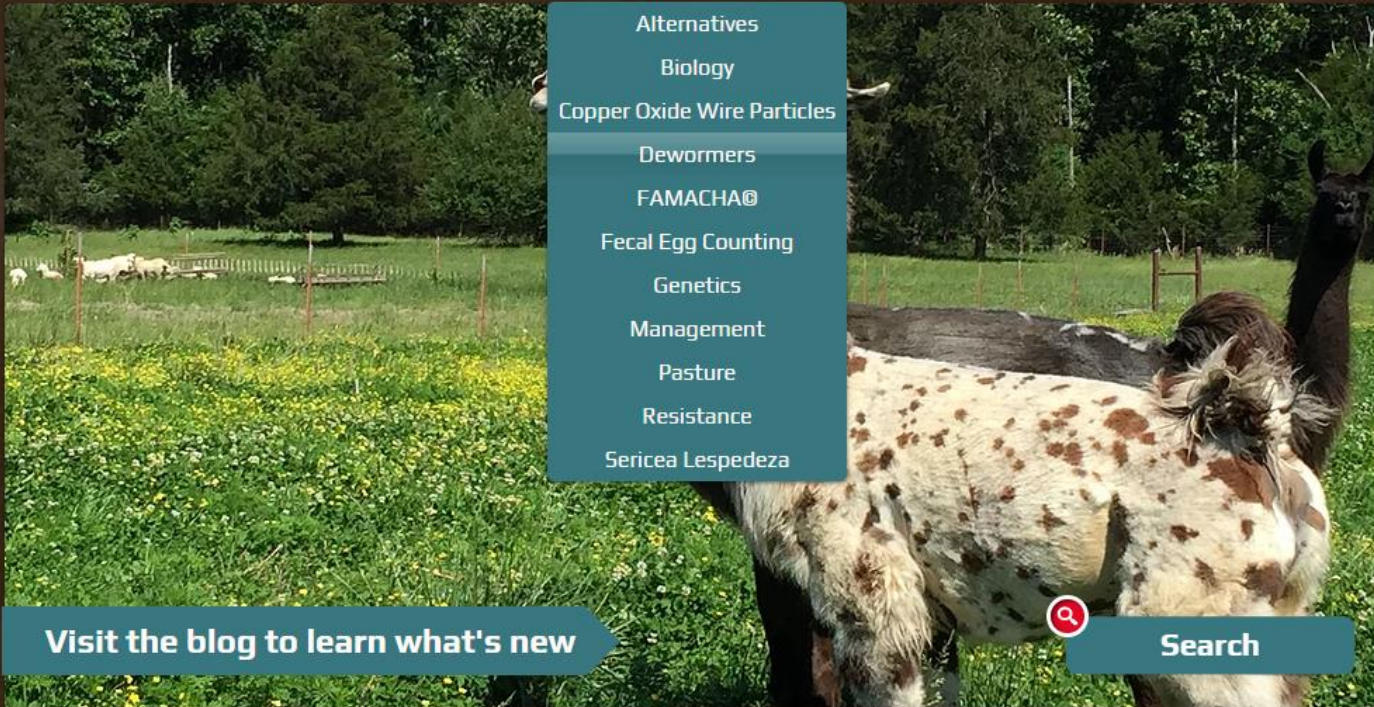
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Dewormers

A dewormer or anthelmintic is a substance that kills internal parasites, usually by starving or paralyzing them. Proper and judicious use of anthelmintics is necessary to prolong their long-term effectiveness.



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Dewormers

A dewormer or anthelmintic is a substance that kills internal parasites, usually by starving or paralyzing them. Proper and judicious use of anthelmintics is necessary to prolong their long-term effectiveness.



Part 3: Attack the Enemy

Part 1: Know thy Enemy

**Part 2:
Outsmart the
Enemy**

*Listen to all
three to get
the full picture!*



Why go through all of this?

- Internal parasites are the worst health problem for small ruminants
- Parasites have adapted to our deworming medications
- Deworming medications were always a short term fix
- Knowledge is power!



ADGA Convention, 2003

- “Dewormers are the WORST way to manage internal parasites!” –Dr. D.G. Pugh, Auburn
- “There are no chemotherapeutic solutions to overstocking pastures or poor husbandry.”
—Dr. Sharon Patton, UT
- “An ounce of prevention is worth a pound of Panacur.” —Dr. Sharon Patton, UT



Management trumps deworming

- New Zealand work with Merino lambs:
 - 1) drenched at weaning and then rotated with cattle 3 times
 - Vs.
 - 2) drenched at weaning, then set stocked and drenched every 2 weeks
- One drench plus rotating was more effective than 26 drenches!!



Selection trumps deworming

- Merino ewes selected for parasite resistance
Vs.
Merino ewes **not** selected for parasite resistance
 - Selected ewes had FEC reduced by 69%
 - And Selected ewes had LOWER FEC than unselected ewes that were strategically drenched
- Another study – selecting for resistance to barberpole: sheep were also able to resist other worms



But sometimes...

- We may have to resort to dewormers. Let's learn how to use them properly!



Anthelmintics

- Benefits:
 - Treated animal gets relief from the worm burden
 - Reduction in egg production = reduced contamination of the pasture
- Limitations:
 - Anthelmintics treat only the animal
 - You **MUST** limit larval intake, or relief is very temporary
 - **Resistance problems**



Today we will cover:

- The problem of resistant worms
- How to keep dewormers
- How to know if they work
- How to properly use
- Natural dewormers
 - Don't get your hopes up
- Resources
- Summary



Parasite life cycle

- Parasite larvae ingested
- Adults make residence in the body
- Adults lay eggs
- Eggs passed in feces
- Eggs hatch and larvae move up blades of grass
- Animals ingest larvae (repeat cycle)

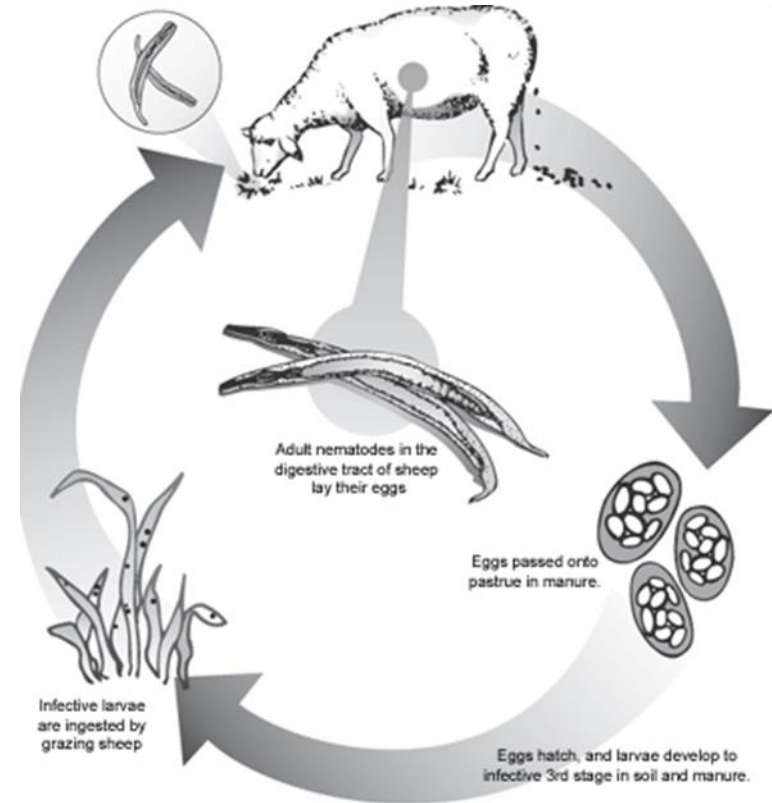


Image courtesy of: www.sheepandgoat.com

Our goals

- Support animal health
 - Low stress
 - Good nutrition
 - Sanitation
 - Grazing to avoid parasites as much as possible
- Select animals that are well-adapted
- Treat only those animals that need it.



Symptoms

- All internal parasites will cause:
 - low energy
 - lagging behind
 - low appetite
 - decreased digestion
 - slow growth
 - weight loss
 - lower production of milk, wool, or meat



Symptoms

- Barberpole:
 - also anemic,
 - may have bottle jaw
- Not barberpole:
 - also diarrhea (scours),
 - not anemic



Five Point Check



Why don't we just treat them all?

- Because of Survival of the Fittest;
- We are encouraging the Super Worms to be more numerous



Resistance to anthelmintics

- See “Managing Dewormer Resistance,” by Dr. Dahlia O’Brien, Virginia State University, at wormx.info under “BMP” tab, “Resources.”
- A recent study of Maryland, Virginia, and Georgia farms found that more than 20% of the farms studied had resistance to ALL drugs.
- Nearly 100% had resistance to one class (Benzimidazoles), and 80% had resistance to Moxidectin.

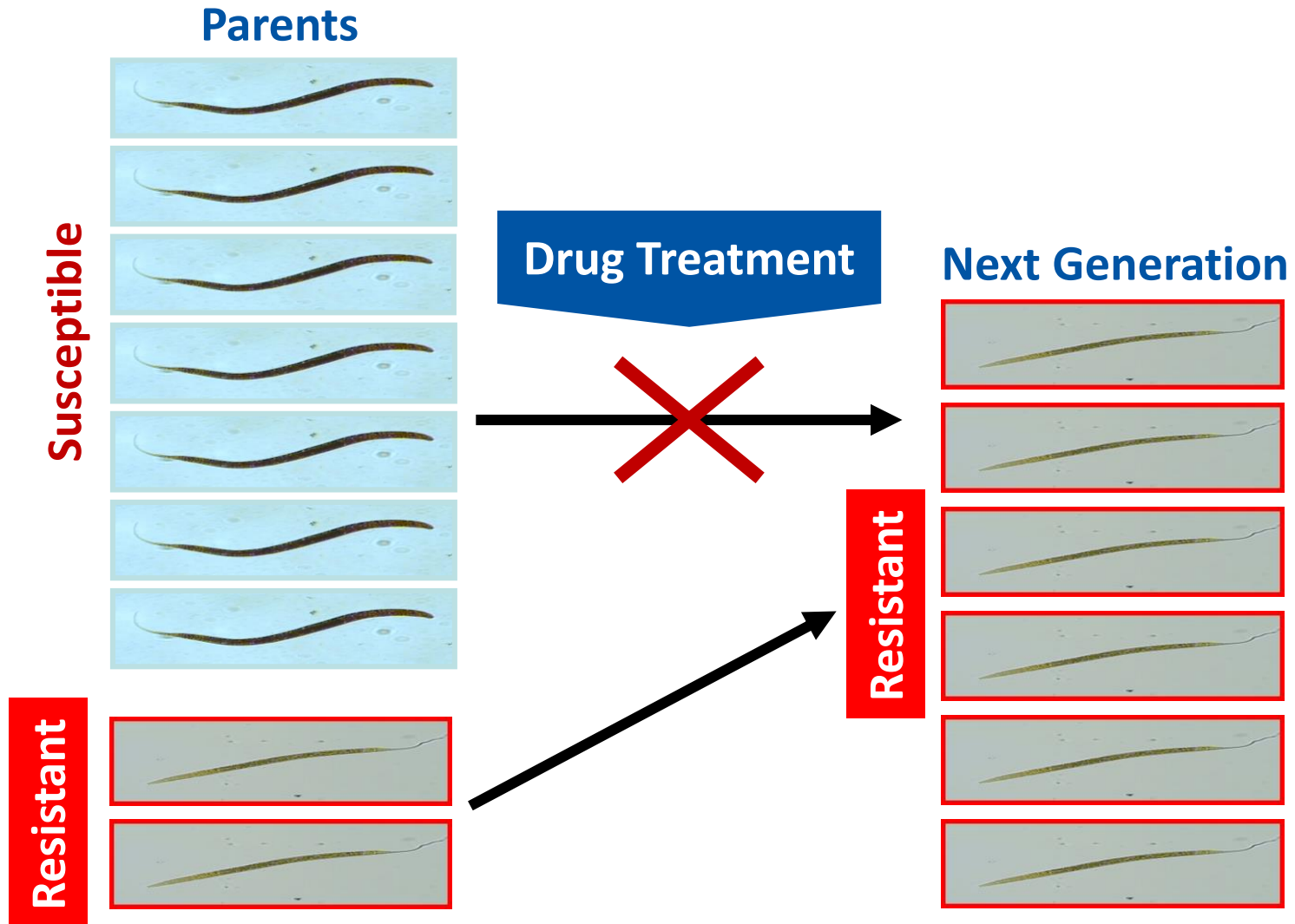


How we encourage super worms

- **Treat everyone** (increases the proportion of super worms in the next generations)
- **Underdose** (allows more of the tough worms to survive)
- **Treat often**
- **Treat and then move to a clean pasture** (now all the worm eggs dropped are the tough ones; and the proportion of tough worms increases in the next generation)



Selection for drug resistance



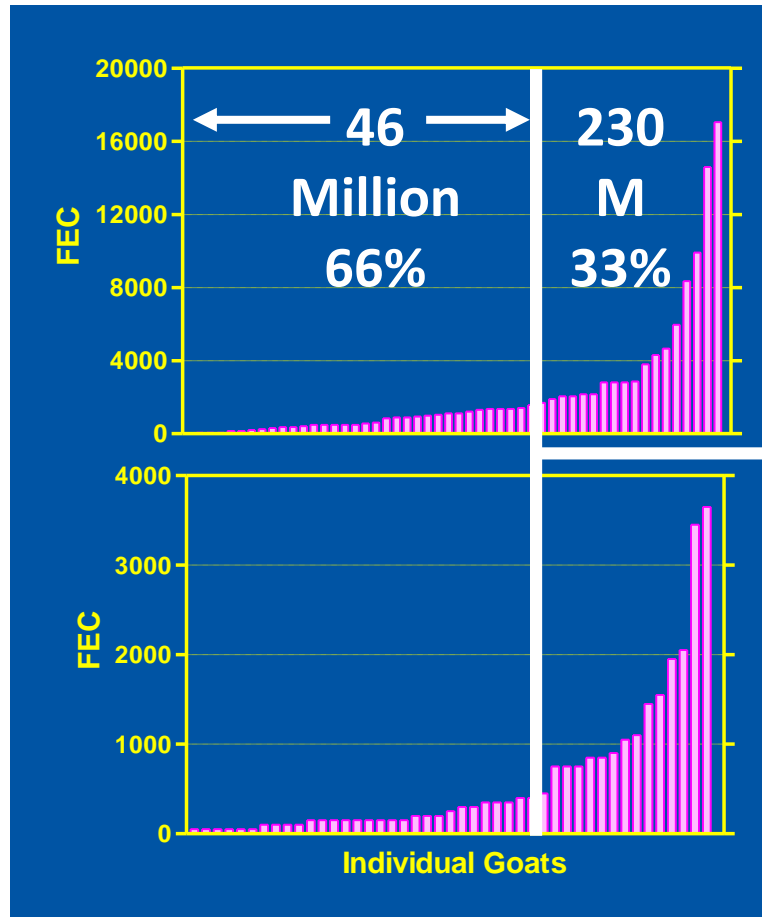
Let's do better

- **Refugia**—in refuge—let's protect the weakling worms so they stay in the gene pool. This is the opposite of “survival of the fittest”
- **Treat ONLY those that need it**
- **Seldom treat**
 - cull those animals that are not resilient or resistant enough
 - fix the management problems
- **Treat effectively**



80/20 rule, Dr. Kaplan

Distribution of FEC in Goat Herds



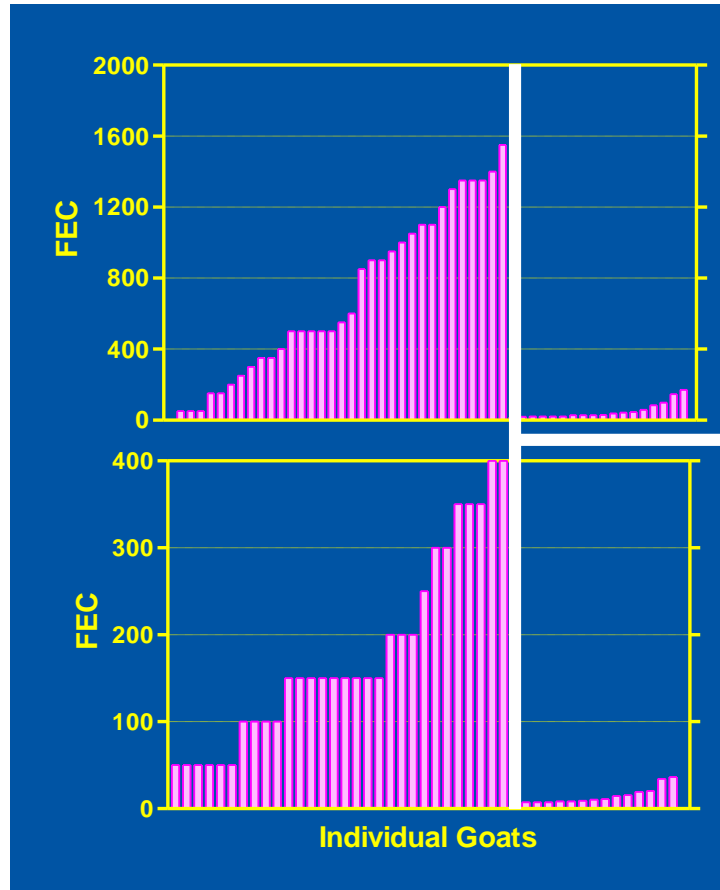
Treating high 33% greatly reduces daily pasture contamination with eggs

33% of Goats
80% of Eggs

Treating 1/3 of goats gives just as good control as treating the entire herd

80/20 rule, Dr. Kaplan

What Happens If We Treat Only the High 33% ???



Treating high 33% with a drug that causes a 99% FECR reduces daily pasture contamination with eggs by 80%

33% of Goats
<5% of Eggs

Following treatment
>95% of eggs are being shed by untreated goats = REFUGIA
Less Resistance

Refugia

- A refuge for susceptible worms
 - Inside animals
 - Outside on the pastures



Treat only those that need it

- First: find out who needs to be dewormed
 - Five Point Check
 - Periparturient ewes and does that have twins or triplets
 - Periparturient yearlings may need attention, too
 - Twins or triplets at weaning time
 - Fecal egg counts (FEC)



Deworm

- New purchases
- Animals with poor condition
 - FAMACHA, BCS, scours,
 - Low energy, scruffy coat
- Be sure to address nutrition
- **Don't deworm all**



You need a veterinarian

- So few drugs are approved for sheep and goats
- And they are not effective in the labeled doses
- So extra-label use is necessary
- And that requires a valid veterinarian/client/patient relationship
- If your veterinarian “doesn’t know about sheep or goats”, you can help them learn. See ATTRA’s [“Working with your Veterinarian”](#)



Improve the dose

- If possible, **fast** those who need to be dewormed for 12-24 hours
 - This slows down the digestive system, gives the drug more time to contact the worms, and greatly increases efficacy
- New Zealand study: Drenching “empty” animals increased effectiveness of kill of resistant barberpole from 53% to 97% using Ivermectin
 - (LC: I wouldn't do this if your animal is already off feed; especially don't do this if your animal has bottle jaw or is FAMACHA score 5 (anemic). This is an emergency.)



Proper dose

- Treat according to the weight of the heaviest in the group. Group them, of course; only ewes, then only lambs. Weigh animals!

We are not good guessers, often.

- Weight tape works for dairy goats.

- See charts at: wormx.info in the topic of dewormers



Proper tools

- Deworming guns with angled piece
- Be sure it's calibrated correctly to dose for the heaviest animal



Proper technique

- All the way into the back of the mouth so it doesn't bypass the rumen
- It's obvious but ... be sure they swallow!!



Proper drug

- Don't forget the fundamentals
 - Consult your veterinarian
 - DrenchRite Assay or FECRT is how you know they work
 - If you are using extra-label, you need a valid veterinary/patient/client relationship
 - Check the expiration date
 - Keep all drugs stored properly
 - Be sure dosages are correct
 - Use oral formulations, not injectable and not pour-on



A little rest for the eyes



Anthelmintics

1. Benzimidazoles (BZ)

- fenbendazole (FBZ; Panacur, Safeguard)
- albendazole (ABZ; Valbazen)

2. Imidazothiazoles/Tetrahydropyrimidines

- levamisole (LEV; Tramisole, Levasole), morantel (MOR; Rumatel, Golden Blend, others)

3. Avermectin/Milbemycins

- ivermectin (IVM; Ivomec)
- moxidectin (MOX; Cydectin)



Anthelmintics

1. Benzimidazoles (BZ)

- fenbendazole (FBZ; Panacur, Safeguard)
- albendazole (ABZ; Valbazen)

- White dewormers

- Don't use albendazole in the first 30 days of pregnancy
- Fasting before treatment helps efficacy
- Using 2 g of copper oxide wire particles (COWP) at the same time helps efficacy



Anthelmintics

2. Imidazothiazoles/Tetrahydropyrimidines

- levamisole (LEV; Tramisole, Levasole), morantel (MOR; Rumatel, Golden Blend, others)
- To avoid toxicity,
 - do NOT fast before using levamisole,
 - Weigh animals before dosing; dose accordingly
 - Goats at 1.5 times sheep dose, NOT double the dose



Anthelmintics

3. Avermectin/Milbemycins

- ivermectin (IVM; Ivomec)
- moxidectin (MOX; Cydectin)
- These will work against hypobiotic larvae (arrested) and mature roundworms
- Do these work on your farm?



Anthelmintics

1. Benzimidazoles (BZ)

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Rotate?

- Not until you have to!!
 - Use one class of drug until it stops working (FECRT) or DrenchRite Assay
 - Then use another class until it stops working
 - Then the third
 - Your fourth option: combinations



Fecal Egg Count Reduction Test

- Larvae to egg-laying in 2-3 weeks in summer
 - Therefore, test the fecal sample of a dewormed animal before the 14 days: 7-10 days after treatment to see if the drug worked

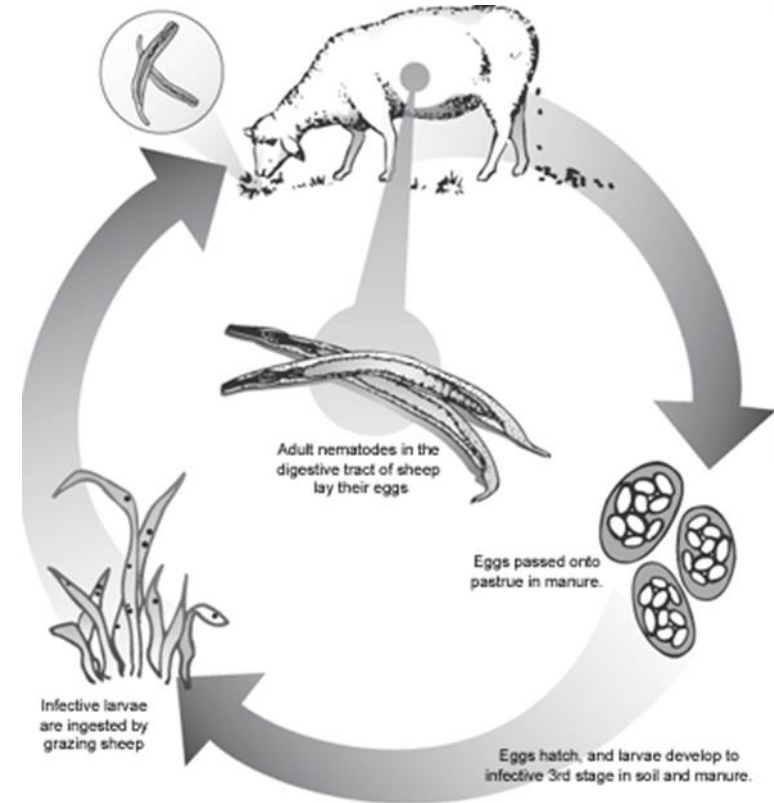


Image courtesy of: www.sheepandgoat.com

Fecal Egg Count Reduction Test

- Formula:
 - $(\text{pre-post})/\text{pre} \times 100 = \% \text{ reduction}$
 - We want at least 95% reduction, or we suspect resistance



Suspect resistance?

- Don't forget that there might be another cause for anthelmintic failure
 - Poor technique
 - Wrong dose
 - Equipment didn't work
 - Animal spit the dose
 - Drug was expired or had been improperly stored
- BUT, if you paid attention to fundamentals and dewormer failed, then resistant worms are the factor



Combinations

- Double the cost, but you get efficacy from combining two different classes of drugs
- You use the correct dose of both
- Don't forget about refugia,
 - Or you'll risk getting worms that are resistant to both of these classes of drugs!
- Calculate withdrawal time by using the longest time of the drugs used. (you don't add them)
- Copper oxide wire particles are an option here, too



Feeding dewormers

- Sounds like a great idea, but ...
 - How do you make sure they get the right dose?
- Golden Blend: no milk withdrawal
 - But when my dairy does actually need it, they would not EAT it
- Underdosing leads to resistance and does not help your animal, either



Other options

- **Copper oxide wire particles (COWP)**
- **Sericea lespedeza**
 - YES, research has shown that they work
 - See ATTRA publications and wormx.info
- How about: DE, pumpkin, garlic, herbal dewormers, wormwood, oregano oil, etc.?
 - These have not been shown to be effective under the conditions of the research studies. Sorry.



Other options

- Worm-trapping fungi
 - BioWorma[®]—see wormx.info
 - Works to lower pasture contamination
 - Feed in supplement (feed or loose mineral mix) daily for at least 60 days
 - The fungus are in the fecal pellet and stop larvae
 - Available in the US; this is environmentally safe and is a way to address pasture contamination. Cost?



A little rest for the eyes



Copper oxide wire particles

- COWP
- See the ATTRA publication and also the Best Management Practices series on wormx.info
- Works against barberpole; use FAMACHA to decide who to dose.
- Some certifiers are allowing the use of COWP in organic lambs and kids.
- Also effective as part of a combination treatment



Keep records

- Know which animals you dewormed,
- Which drug, at which dose,
- What your criteria were (FAMACHA? BCS?)
- What the flock FAMACHA scores were (track trends)
- To test efficacy: at least every couple of years, run a FECRT or DrenchRite assay
- Pasture management records—to be sure you are not going back too soon to an infective pasture



FAMACHA records

FAMACHA ANEMIA RECORD

Group ID: _____

Category						Totals				
	1	2	3	4	5	1	2	3	4	5
Date: 5/1 Treatment:	●●●●●●●● ●●●●●●●●	●●●●●●●● ●●●●●●●● ●●●●●●●●	●●●●●●●● ●●●●●●●●	✓		15	27	12	1	0
Date: 5/15 Treatment:	●●●●●	●●●●●●●● ●●●●●●●● ●●●●●●●●	●●●●●●●● ●●●●●●●● ●●●●●●●●	✓✓✓✓✓✓✓✓		5	22	20	8	0
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Date: Treatment:										
Date: Treatment:										

● Counted

✓ Counted and Treated

✗ Bottle Jaw - Treated

Ray M. Kaplan, DVM, PhD

FAMACHA Anemia Record

5/30/03



FAMACHA ANEMIA RECORD

Group ID: _____

Category						Totals					
	1	2	3	4	5	1	2	3	4	5	
Date: 5/1 Treatment:	●●●●●●●● ●●●●●●●●	●●●●●●●● ●●●●●●●● ●●●●●●●● ●●●●	●●●●●●●● ●●●●●●●●	✓			15	27	12	1	0
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Date: Treatment:											
Date: Treatment:											

● Counted

✓ Counted and Treated

✗ Bottle Jaw - Treated

Monitoring

- Get in the habit of observing behavior and appearance every day. Movement, appetite, coat or fleece, evidence of scours, appearance of lambs and kids, body condition score.
- Fecal egg counts
- FAMACHA every 2 weeks for lambs and kids
- Monitor around periparturient time
- When there's been a drought, and then a good rain; check them 2 weeks later



Another rest for the eyes



Coccidia

- Don't respond to the same drugs
- Damage the intestines
 - If not treated, damage may be permanent
- Adult animals usually have immunity
- Young animals under stress may suffer; scours is the first symptom



ATTR's [Coccidiosis: Symptoms, Prevention, and Treatment in Sheep, Goats, and Calves](#)

Coccidia

- First, sanitation and good nutrition
- Medications listed in ATTRA pub
- Sericea lespedeza helps
- Organic producers
 - Consider growing hay to have for young animals
 - You may not use coccidiostats for organic animals



Liver flukes

- These need an intermediate host, snails:
- Flukes are ingested from vegetation, penetrate intestines on their way to eat the liver.
Internal bleeding
 - So, anemia, bottle jaw are symptoms
- To prevent: fence out of marshy areas and ponds
- To treat: Valbazen kills adult flukes (not other stages)



Consult your veterinarian

- There are worms that are important where you live
- Local veterinarian can help you figure out what drugs are effective
- Veterinarian is needed for extra-label drug use
- Necropsy can be a valuable tool



We have a lot to learn

But information is available to help us manage our animals successfully.

We just need to be smart, and use a lot of strategies to combat this enemy.

We also need to pay attention to our animals and to

management, selection, and careful and sparing use of anthelmintics.



Resources

- www.attra.ncat.org
- www.wormx.info
 - American Consortium for Small Ruminant Parasite Control
- www.luresext.edu
 - Langston University
- www.sheepusa.org/Growourflock [Resources](#)
[EducationalWebinars](#)
 - American Sheep Industry
- www.sare.org
 - Sustainable Agriculture Research and Education



Suggested Homework

- 1) Go to wormx.info and explore the topic of dewormers.
- 2) If you missed Part 1 or Part 2, set a time to watch them.
- 3) Next time you need to deworm, do a FECRT to see if your drug was effective.
- 4) Do you have a system for keeping records of health treatments? Set one up. Plan to cull animals that need frequent deworming.
- 5) Are you FAMACHA trained yet? That's a great idea for 2019!



Good luck!

- Call us at 800-346-9140 if you need further information about sustainable agriculture, including sustainable parasite control.
- “Put drench in the bottom of your tool box!”
 - (from Meat and Wool New Zealand)
 - But let’s KEEP it in your tool box.



Upcoming ATTRA webinar

Webinar: Thur, Mar 14, 2019 12:00 PM - 1:00 PM MDT

Don't Let the Barber Pole Worm Ravage Your Flock



Register at:
[https://attra.ncat.org/
barber-pole](https://attra.ncat.org/barber-pole)



Questions & Answers



Please type your Q's into the chat bar



Lydia's Flock Registered Icelandic and Shetland Sheep in Washington

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