

# Integrated Parasite Management for Your Goats

# Significance

- Internal parasites are the number one health problem of goats in the Southern United States
- Oklahoma has:
- Warm moist weather in spring and early summer conducive to parasites.
- Hot dry summers are hard on parasites

# Worms (Internal Parasites)

- Mother Nature's population control police-keep populations from overrunning area when production conditions are good, but also reduce populations when feed is limiting.
- Worms are normal. Excessive worms causes severe health problems

# Problem: Dewormers Don't Work

- Ignorance
- Lack of management
- Therapeutic approach
- Overuse of dewormers
- Dewormer resistance is the greatest threat on the horizon to small ruminant production

# Problem: Dewormer Don't Work

- Previous parasite control strategies have been built around the use of dewormers only
- With dewormer resistance, our paradigm must change if our goats are going to survive.
- Use an integrated pest management approach (IPM)

# IPM Principles

- Identification of pest
- Knowledge of biology and life cycle
- Planning
- Use of management practices for prevention
- Deworm when management is not enough
- Evaluation of results
- Feedback to modify plan

# Parasitology

- Parasites-anything bigger than bacteria that live in other species
- malaria parasite, giardia, toxoplasma, anaplasma, coccidia, brain worm, cestodes (tape worms) nematodes (roundworms) and trematodes (flukes)

# Identification of Pest

- Barberpole worm, *Haemonchus contortus*, feeds on blood in abomasum, causes anemia, poor performance and death. Tropical roundworm, likes it hot. Major cause of deaths in goats due to worms

# Barberpole Worm





- *Barberpole worm* adults in the abomasum

# Temperate Roundworms

- Bankrupt worm, *Trichostrongylus colubriformis*, feeds on mucus in small intestine, causes diarrhea, reduced appetite, poor performance
- *Brown stomach worm, Teledorsagia circumcincta, or Ostertagia* -feeds on secretory cells of abomasum and causes loss of blood plasma, diarrhea, reduced appetite, poor performance

# Other Internal Parasites

- Tape worm
- Affects basically young animals in confined management
- Identify as flecks of rice in feces
- Causes slow growth, poor performance
- Use a dewormer effective against tapeworms

# Other Internal Parasites

- Coccidiosis
- Causes diarrhea in stressed animals especially weaned kids and animals stressed, especially by shipping.
- Prevention with medicated feed with Rumensin or Deccox
- Treat with Albon or Corid

# Other Internal Parasites

- Lungworms- causes chronic cough  
Get veterinary assistance on problem
- Meningeal worm (deerworm) causes progressive paralysis of tail and rear legs.
- Get veterinary assistance on problem

# Worm life cycle

- Life cycle is very important to understand so you know some actions to take to reduce worm problems and also, why some environmental conditions or management practices increase worm problems so that you can be alert for parasite problems

# Life Cycle 2

- Egg in feces from animal falls to ground
- Requires warmth 50+F and humidity to hatch to first stage larva, abbreviated L-1 in 1-6 days
- Winter parasites are less of a problem
- Dry hot summer parasites are less of a problem

# Fecal Pellets With Eggs





- All trichostrongylids produce similar eggs which are passed in feces

# Life Cycle 3

- Direct sunlight can heat fecal pellet to 155 F and sterilize pellet
- Diatomaceous earth helps pellet to dry out?
- Shade trees and tall, dense grass increase humidity and shade fecal pellets from the sun

# Life Cycle 4

- L-1 eats bacteria in feces and grows, molts (sheds skin like a snake) and becomes L-2
- L-1 and L2 are subject to being killed by drying out. Heat and low humidity will kill them in the pellet

# Life Cycle

- L-2 eats bacteria in feces and grows and molts to L-3. However, the cuticle (skin) is not shed, so the L-3 has 2 layers of cuticle. This makes the L-3 much more resistant to drying out.



- Note how the old cuticle is surrounding the L3 stage
- This means the L3 can't feed and must rely on stored metabolites or energy to survive

# Life Cycle 5

- However, the L-3 cannot eat, because his mouth is covered. He must live off his stored reserves.
- Since he is cold-blooded, his metabolism speeds up when it is hot. He can only live about 30-60 days in hot weather or 120-240 days in cool weather.

# Life Cycle 6

- Takes about 6-14 days from fresh fecal pellet to L-3
- The L-3 must escape from the fecal pellet to infect an animal
- The L-3 can only survive in pellet until he runs out of stored energy

# Life Cycle 7

- Pellet must be broken up by rain (2 inches in a months time) and then the larva scoots on a film of water (from rain or dew) to under fallen leaf or other debris or scoots on a film of water 2-3 inches up forage.
- Close grazing or picking up debris infects goats



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- L3 larvae caught in a dew droplet on a stem of grass

# Life Cycle 8

- Maybe only 0-10% of eggs end up as L-3 larvae on forage.
- L-3 must be eaten by goat or sheep to continue development
- L-3 inside goat leaves its sheath and molts to L-4.
- L-4 can enter suspended animation called hypobiosis or arrested form

# Life Cycle 9

- Arrested form of L-4 does not stimulate animal's immune system and is harder for dewormer to kill
- Barber pole worm is killed by freezing but overwinters as arrested L-4 and survives hot dry summers in the goat
- Otherwise L-4 molts to L-5 which is adolescent which develops ovaries and uterus and then molts to an adult which lays thousands of eggs per day

# Arrested Form

- Triggered to awake and develop by kidding/lactation/increasing daylength
- Awakes when old worms die off or are killed by dewormer
- Reason for old recommendation of deworming a second time two weeks after deworming with Benzamidoles.

# Life Cycle 10

Goats have a weak immune response against parasites due to being raised in the desert where there were no challenges from worms. However, some individual goats have a stronger response than others. Some breeds appear to have a greater proportion of resistant animals.

# Immune Response

- Good nutrition stimulates immune system
- Can select goats for low fecal egg counts
- Other diseases which depress immune system (e.g. coccidiosis, pneumonia) can cause increased worm problems

# Life Cycle 11

- When goats are lactating, immune system is suppressed and does not fight parasites. Arrested larvae acquired during the fall all mature simultaneously in the spring during lactation. Rationale for deworming around kidding time.

# Management Practices for Prevention

- 1. Stocking rates < 2 hd/ acre
- 2. Grazing cattle or horses with goats
- 3. Don't graze close to ground
- 4. Haymaking or tillage
- 5. Pasture rotation with 6 or more weeks rest
- 6. Browse or animals eating off ground
- 7. Cull wormy animals

# Barber Pole Worm

- Dominant species in warm climates
- Produces 1-6,000 eggs/day
- Develops dewormer resistance more rapidly than other species because of 3 wk generation interval.

# Risk Factors for Barber's Pole worm

- 1. Warm weather
- 2. Two inches of rain in a month
- 3. Grazing pastures short
- 4. High stocking rates
- 5. Thin animals
- 6. Animals in lactation
- 7. Long residence on a pasture

# Symptoms of Barber Pole Worm

- Barber pole worm consumes 1-5 drops of blood per day. 1,000 nearly a pint of blood in a week.
- Causes anemia (low red blood cell number), hypoproteinemia (low blood protein) edema and ultimately death
- Blood is normally 36% red blood cells
- Deworm when 20% red blood cells
- Goat near death at 8% red blood cells
- Coccidiosis, liver fluke and lice can cause anemia

# Monitoring Barber Pole Worm Infection

- Look at color of mucous membranes-under lower eyelid, gums, inside vulva. Good pink color is good, pale watery color indicates anemia
- Make a habit of noticing animals with white around eyes



	
	 <b>DANGEROUS - DOSE!</b>
	 <b>FATAL - DOSE!</b>
	





Bottle Jaw-bulge under throat from edema

# Just a “Wormy” goat



# Symptom of Barber Pole Worm

- Fecal egg counts are the best measure, reflecting the number of mature worms in the goat. Takes 1-2 weeks from L-3 to egg laying adult-it is possible to accumulate enough worms to have anemia and fecal egg count not yet increased. Is rare.

# Planning a Parasite Control Program

- 1. Use management practices that are applicable to your farm to prevent worms
- 2. Monitor parasite problems with fecal egg counts or eye scores
- 3. When you have a parasite problem determine why and change parts of management that you can.
- 4. Only use dewormer when necessary

# Planning a Parasite Control Program

- 5. Cull wormy animals
- 6. Deworm new animals coming on your place with 2 classes of dewormer
- 7. Notice eye mucous membrane color when you check animals
- 8. Use good nutrition

# Alternative Control Strategies

- Copper oxide wire capsules
- Seems most effective in young animals.
- Dose is 2.0 g. Must break down Copasure capsules into gelatin capsules
- Use only on animals that need deworming

# Alternative Control Strategies

- Nematophagus fungus-entraps larvae in manure. Company developing product for sale
- Short duration, long rest grazing management. Graze 5 days, rest 40+ days. On improved grasses, could rest 4 wks, take a hay cutting and then graze several weeks later.

# Alternative Control Strategies

- Sericea lespedeza
- Grazing sericea lespedeza reduced fecal egg count by 50% and reduced egg hatch rate and success of larval development.
- Did not need to deworm goats grazing sericea lespedeza.

# Alternative Control Strategies

- Herbal dewormers, Garlic and Ginger and wormwoods. Have some research indicating that they can work although not as successful as drug dewormers.
- If you use them follow fecal egg counts or at least eye scores.

# Conclusion

- If you do not manage your parasites, they will manage to put you out of the goat business.