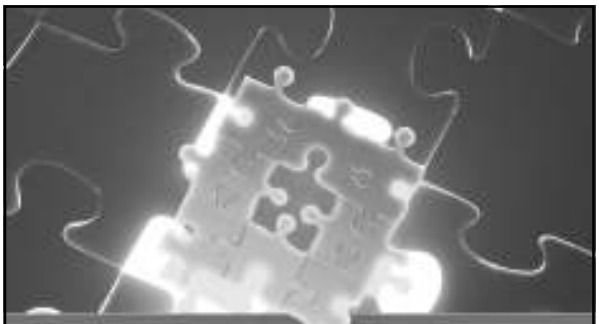


Putting the Pieces Together; Herd Health, Diseases and Disease Prevention in Meat Goats

Dr. Curt Vlietstra, Pipestone Veterinary Clinic

Who Are You?

- Commercial vs. Purebred
- "Fulltime" vs. "Hobby"
- How many goats?
- Other animals on the farm?

Why Meat Goats?

- Fun?
- Rewarding?
- Money??

Why a Vet? Why Goats?

PIPESTONE Veterinary Clinic

Common Challenges to Raising Healthy Goats

- Parasites
- Abortion
- Pneumonia
- Diarrhea (non-parasitic causes)
- Nutrition
- Other Infectious Diseases
  - CAE
  - CL

What Can a Vet Do For You?

- Products, Scripted and OTC
  - Kidding supplies
  - Nutritional supplements
  - Antibiotics
- Diagnostics
  - Relationship with diagnostic laboratory if unsure of likely cause based on signs and necropsy findings
- Protocols and troubleshooting

Parasites

- GI worms
  - Roundworms
  - Tapeworms
- Coccidia
- Flies
- Lice
- Mange
- Ticks

GI Worms

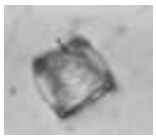
- More of a problem for goats than other ruminants
  - Eating habits
  - No natural immunity

Common GI Worms

- Stomach (abomasum)
  - Haemonchus ("Barber-pole worm")
  - Ostertagia ("Brown stomach worm")

Common GI Worms

- Small intestine roundworms
  - Strongyles
- Tapeworms
  - Monezia



GI Parasite Diagnosis

- Fecal exam
  - Will almost *always* find something that could be important
  - Significant or not?
- Quantitative fecal count (McMaster's)

Goat Fecal Exam

Mix small amount of feces with flotation solution (sugar or salt typically)

Let mixture sit for 2 minutes

Goat Fecal Exam

Pour mixture through tea strainer

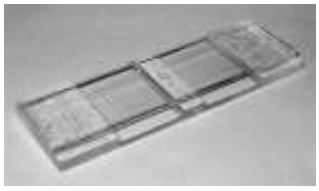
Fill empty blood or centrifuge tube with solution

Goat Fecal Exam

Fill tube until "positive meniscus" is formed

Place glass microscope slide cover slip on top of tube; wait 15 minutes for eggs to float up and examine under microscope

McMaster Fecal vs. Standard



McMaster Fecal Exam

- Complicated—most vet clinic labs will not run. U of M lab very accurate
- Requires very precise measurements of feces, water, and flotation solutions
- Provides "total number of eggs per gram of feces"
- Only considered truly accurate for some classes of worms—others, including coccidia are noted as "present"

Worming (De-Worming)

- Which wormer to use?
  - Adults/kids?
  - Pregnant?
  - Season?
  - Effective vs. your worms?
- How to use?
  - Rotate?
  - Use one until it doesn't work?

Worming Strategies – The Good

- Strategic worming
  - Done when most worms are in the goat, not on the pasture
  - In Northern Plains, winter works best
  - For those who kid in Jan-Feb, worm doe <2 weeks post-kidding
  - Use with good pasture management
- "Weather" worming
  - 10-14 days after heavy rain

Worming Strategies – The Bad

- Schedule worming
  - Worming every 2-4 weeks
  - Labor-intensive
  - Expensive
  - Speeds development of resistance

Worming Strategies – The Ugly

- Salvage worming
  - Wait until you see them sick
  - Loss of production
  - Compromised immune system
  - Shedding high numbers
- "Might as well" worming
  - Worm while vaccinating, trimming hooves, etc.
  - Other way around works better!

Wormers

- Organophosphates
  - Levamisole (Levasole, Tramisole, Prohibit)
  - Morantel Tartrate (Rumatel)
- Benzimidazoles
  - Albendazole (Valbazen)
  - Fenbendazole (Safeguard/Panacur)
  - Oxfendazole (Synanthic)

Wormers

- Avermectins
  - Ivermectin (Ivomec and generics)
    - Drench and injectable
  - Doramectin (Dectomax)
  - Eprinomectin (Eprinex)
  - Moxidectin (Cydectin)
- Only Morantel and Fenbendazole are approved—all others are extra-label!
- Valbazen, Synanthic, Cydectin, ivermectin drench are all common wormers known to be potentially dangerous to use in pregnant does

A Word on Resistance

- Know your wormer classes
- Avermectin resistance is less in Northern Plains
- Resistance to organophosphates is usually reversible
- Worms resistant to avermectins are weak in the environment
- Worms resistant to benzimidazoles are nasty, nasty bugs

Resistance

- If no goat dose given, 2X cattle dose
- Appropriate dose given on an empty stomach is very effective strategy
- Use of injectable products and cattle pour-ons topically is discouraged
- Don't over-use a good wormer
- Don't rotate too soon
- Be responsible!

Coccidiosis

- Difficult to find a "clean" animal
- Stress-induced breaks
  - Nutrition
  - Kidding
  - Weaning
  - Weather
  - Other diseases including worms

Coccidiosis

- Treatment
  - Amprolium (Corid) may be only effective drug at high dose
    - High doses may induce polio-like disease
    - Short duration of effect
    - Needs to be combined with a preventative drug (coccidiostat) if used at all
    - Not recommended routinely unless needed
  - Sulfa drugs preferred (Sulfadimethoxine, Sulfaquinoxaline, Sulfamethazine, etc.)

Coccidiosis

- Prevention
  - Monensin (Rumensin) at 15-40 gm/ton of complete feed (DO NOT TOP-DRESS)
  - Lasalocid (Bovatec) at 20-30 gm/ton
  - Decoquinate (Deccox)
    - Wide dose range; extremely safe
    - Can be mixed with loose white salt
  - Amprolium (Corid) at label dose
  - Sulfonamides

External Parasites

- Flies during the summer
- Lice during the winter
- Ticks, mange, etc.

External Parasiticides

- De-Lice
- Saber
- Ultra Boss-recently gained goat approval
- Some injectable wormers (avermectins) also work against some external parasites

Questions

Caprine Abortion

- Chlamydia
- Toxoplasma
- Coxiella burnetii
- Others

Chlamydiosis (*Chlamydia psittaci*)

- Several forms of the disease
  - Abortion
  - Epididymitis
  - Pinkeye
  - Pneumonia
  - Arthritis

- 2 "strains" of *Chlamydia psittaci*
  - Abortion (type I) and "other" (type II)
  - Not known to cross roles at this time

Chlamydia

- After the female is exposed, the infections remains dormant until conception
- Organism proliferates at day ~90
- Inflammation and necrosis of placenta
  - Decreased nutrient transfer to kid(s)
- Last trimester abortions most common
- May see abortions, stillbirths, weak kids, neonatal pneumonia, and normal kids

Chlamydia

- Doe may go off feed, develop fever, and have a bloody discharge prior to aborting
- May see thickened placenta with gray, white, or yellow cotyledons
- Highest shedding for three weeks after aborting
- May shed during estrus following abortion
- Doeling possibly exposed at birth!

Chlamydia – Epidemiology

- In naïve herds, abortion rate may be as high as 60%
- In "endemic" herds, usually limited to replacements and new purchases (1-15%)
- "Natural immunity" following an abortion typically lasts 3-5 years

Chlamydia – Prevention (Treatment?)

- Vaccinate pre-breeding, 2 injections initially
- Feed tetracycline (crumbles) in the feed
  - ¼ - ½ gram per head per day
  - Last 6-8 weeks before kidding through 3 weeks after kidding +/- breeding
- LA-200 injections starting 6-8 weeks pre-kidding, then every 2 weeks or once 3 weeks after kidding

Toxoplasmosis (*Toxoplasma gondii*)

- Mummies, abortions, stillbirths, weak-borne live
- Doe rarely becomes ill
- Infections pre-breeding rarely result in abortions
- Infections 1-3 months result in abortions, mummies, and fetal resporption

Toxoplasmosis – Lesions

- Mummified fetuses
- Cotyledons have gray-white or yellow areas and calcification
  - Clearly visible after washing
- Fetus will have brain lesions

Toxoplasmosis – Prevention

- Cat control!!
- No vaccine available in US
- Feeding Deccox and Rumensin throughout gestation (not just last trimester)

Q-Fever (*Coxiella burnetii*)

- Venereal transmission and tick bites associated (along with aborted materials)
- Infected animals often normal – no abortions seen
- Placentitis, similar to *Chlamydia*
- No vaccine
- Tetracyclines (in feed or injections)

Other Abortion Causes

- Leptospirosis
  - Multi-valent cattle vaccine twice a year
  - Clean water supply
  - Tetracycline in the feed
- Brucellosis (*Brucella melitensis*)
  - No vaccine or treatment in US
- Campylobacter (Vibrio) – sheep, not goats
- Salmonella
- Mycoplasma

Other Abortion Causes

- Akabane (similar to Cache Valley Virus abortions in sheep)
- Border disease
- Yersiniosis
- Listeriosis (sheep so far)

Abortion Diagnostics

- Done in a laboratory, NOT on the farm
- Fresh placenta, refrigerated until shipping
- Fresh aborted fetus, refrigerated until shipping
- Vaginal swab taken within 3 days of abortion if placenta not available

Zoonosis
(sick goat = sick YOU!)

- Chlamydia?
- Toxoplasmosis?
- Q-Fever?
- Leptospirosis?
- Brucellosis?
- Salmonellosis?
- Listeriosis?
- Campylobacter?

YES!! Every one

Questions on Abortion??

Diarrhea in Kids

- Neonates
  - E. coli
  - Rotavirus
  - Salmonella
  - Cryptosporidium
- Older kids/young adults
  - Worms and coccidiosis
  - Clostridium

E. coli (ETEC)

- May see kids die before diarrhea is seen
  - "Wet mouth" due to increased salivation
  - "Sloshy," fluid-filled stomach
  - <1 day old is possible
- Diarrhea leading to rapid dehydration, bicarb loss, and death

Prevention

- Cattle vaccine to pregnant does?
- Autogenous vaccine
- Oral E. coli antibody (Bar-Guard-99, Ecolizer)

Treatment

- Oral antibiotics
  - Trimethoprim sulfa, 3cc/10 lbs twice a day of human pediatric solution (240mg/5ml)
  - Spectinomycin, 1cc/10 lbs twice a day of oral piglet product (50mg/ml)
- Oral/injectable combination
  - Excenel/Naxcel, ¼ cc both ways day 1, then inject ¼ cc day 2 and 3
- Antibiotic side-effects?

Fluid Replacement

- Oral
  - 2 tsp *noniodized* table salt + 1 tsp lite salt + 50 cc of 50% dextrose + water to make 1 liter
- SQ/IV fluids
  - 20 cc of 50% dextrose + 50 cc 8.4% Sodium Bicarbonate + 1000 cc sterile saline or lactated ringers solution (LRS)
- Depending on size and severity of dehydration, 250-500 cc/kid

Colostrum Feeding and Supplements

- No substitute for the real thing
- Pasteurized colostrum may lose value
  - Use primarily limited to instances where diseases transmitted through colostrum are a concern
  - Use in conjunction with colostrum supplement
- Supplements are warranted if:
  - Unknown colostrum intake by 6-12 hours
  - Disease outbreak (E. coli in particular)
  - Too much kid for the doe

Other Causes of Diarrhea

- Rotavirus
  - Non-responsive to antibiotics
  - Fluid replacement/supportive care
  - Different strain than most other animals, so alternate-species vaccinations of unknown value
- Cryptosporidiosis
  - Supportive care
  - Kids may appear healthy until severe dehydration causes depression

Other Causes of Diarrhea

- Salmonellosis
  - Oral antibiotics of little value
  - Excenel/Naxcel as for E. coli
  - Supportive care
- Feeding
  - Poor-quality replacer, mixing errors, or sporadic feeding intervals
  - May lead to infectious causes

Clostridium perfringens

- Type B in young kids (<3 wks)
- Type D in older, rapid-growing kids on concentrate rations or with sudden diet changes
- Animal appears very painful and depressed
- May see bloody diarrhea and neurologic signs of varying degree (> in sheep)

Clostridium – Prevention & Treatment

- Nutritional/health management
- Vaccination
  - 1 month old, booster at 2 months
  - 1 week, then 1 month in problem herds
  - Use C/D +/- tetanus (not 7 or 8-ways)
  - 2-3 vaccinations/yr
- Antitoxin in the face of an outbreak
  - Treatment rarely successful after symptoms

Pneumonia-Pasteurella

- *Pasteurella multocida* and *Mannheimia haemolytica*
- Most common form of pneumonia in goats
- Normal inhabitant of the upper-respiratory tract – opportunistic
- Signs from decreased appetite to sudden death
  - Can cause a septicemia

Pasteurella Prevention and Treatment

- Bi-valent killed vaccine exists
- Reports of success using with cattle intranasal vaccines
- Susceptible to many antibiotics if caught soon enough
- Sulfa drugs in the water in the face of an outbreak

Mycoplasma Pneumonia

- 2 types
  - Contagious Caprine Pleuropneumonia
    - Rapid spread with many quick deaths
  - Other form causes pneumonia and mastitis in adults; meningitis in kids; arthritis in both
- Treat with Draxxin, Tylan, Lincomycin, or LA-200 for 5-7 days
- Autogenous vaccines of little benefit

Other Pneumonias

- Chlamydia
- Caprine Arthritis-Encephalitis
- Caseous Lymphadenitis
- Aspiration pneumonia
- Plant toxicities can cause pneumonia (uncommon in Northern Plains) and pneumonia-like symptoms (nitrate-nitrite toxicity)

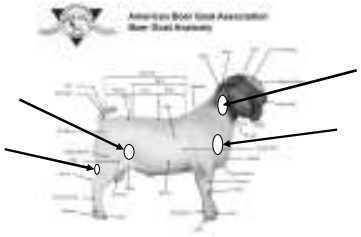
Questions?

Caseous Lymphadenitis

- Caused by *Corynebacterium pseudotuberculosis*
- Enters body through small wounds or mucous membranes
  - Eyes
  - Lungs
  - Mouth
- Localizes in a regional lymph node
- May take 2-6 months or more for an abscess to become visible

CL

- Two forms: External and Internal
- Common sites for external abscesses:



CL – Internal Form

- Lung abscesses if inhaled or if organism travels through chest lymph vessels
- Mesenteric (by the guts) abscesses also possible
- Variety of signs, but wasting is most common
- May be accompanied by external lumps

CL – Diagnosis

- Culture material from an abscess
  - Best done with FNA (Fine Needle Aspirate) to avoid overgrowth of sample
- Blood test
  - Not accurate enough to use for purchase or culling decisions
- Simply noticing lumps in the right (wrong?) spots if it's in your herd
  - +/- Appearance of the pus

CL – Treatment

- Antibiotics are not effective
- Lance and drain
  - Big hole, but try to avoid DBAE—there are some BIG blood vessels close by
  - Lancing and draining helps avoid spontaneous rupture, which seeds the environment and exposes curious herdmates
  - "Pus containment"
- Flush, then torch everything

CL – Treatment

- What about formaldehyde or formalin?
  - The injection of formalin into meat animals (dead or alive) for any reason is restricted
  - The treatment of carcasses destined for human consumption with formaldehyde or formalin is restricted

CL – Vaccination

- Sheep vaccine (Colorado Serum Co.) can be disastrous?
- Knowledge of sheep vaccine used in sheep
- Autogenous vaccines
- Foreign vaccines
- Colorado Serum Co. Goat CL Vaccine

CL – Herd Management

- Lance, drain, flush, isolate
- Identify and cull
- + and – herds on the same farm
- Facility care
- External parasite prevention
- Cull chronic respiratory and wasting animals

CL – Financial Impact

- Carcass and hide condemnation
- Rarely see enough internal cases within a herd to affect the "big picture"
- Purchases and sales; honesty and integrity are highly recommended, but unfortunately not mandatory

Questions on CL?

Caprine Arthritis-Encephalitis

- RNA virus similar to HIV in humans, OPP in sheep, EIA in horses
- No treatment
- More prevalent in dairy goats/crosses
- Arthritis, paresis/neurologic dysfunction, hypogalactia +/- mastitis, progressive wasting
- 1984 report showed >65% herd prevalence in US; 81% of individuals

CAE – Control

- Blood test (ELISA>AGID) quite accurate
- Test and quarantine, then retest negative animals
  - Time lapse between infection and immune response is unknown
  - Proper quarantine period us unknown
- Buy replacements from negative herds
- Colostrum management

Questions on CAE?

Nutrition Quickie

- Malnutrition and using improper ration ingredients is thought to be the most common cause of disease, including parasitism
- Use of corn and protein alternatives during times of high feed costs?
  - Use with caution and know what you can manage
- Keep it simple

Thanks!