

Healthy Animals, Healthy People Workshop

## Small Ruminant Herd Health



Santa Rosa, September 29, 2018

**Alda Pires, DVM, MPVM, PhD, Dipl. ACVPM**  
 Urban Agriculture & Food Safety, Extension Specialist  
 School of Veterinary Medicine, UC Davis




1

## Background




Food Animal Clinician (small - large - scale farms) and Lecturer, Portugal & UC Davis

Veterinary Epidemiologist (Food Safety & Epidemiology of Infectious Diseases), MSU & UC Davis

Urban Agriculture & Food Safety, Extension Specialist, School of Veterinary Medicine, UC Davis

2

## What is Cooperative Extension?



**Mission Statement:** Statewide Network of researchers and educators focused on the creation and application of knowledge in agriculture

- 200 locally based CE advisors and specialists
- 57 local offices
- 130 campus based CE specialists
- 9 research and extension centers
- 700 academic researchers

<http://ucanr.edu/>


**\* Extension Specialists, Researchers and Farm Advisors**

**Commercial & Backyard Livestock /Poultry**

[http://ucanr.edu/sites/Small\\_Farms/](http://ucanr.edu/sites/Small_Farms/)


3

## Goat Herd Characteristics



- Dairy, Meat, Fiber, Brush clearance, Packing, Biomedical use, Companion

Commercial producer  
 Seedstock breeder  
 Family/small herd  
 Youth 4H/FFA project  
 Individual pets



Slide courtesy of Dr. Rowe

4

### What is the desired product?




**Milk, Cheese, Market Kids, Fiber, Ability to Browse/Travel, Companionship**

Slide courtesy of Dr. Rowe

5

### Goat Herd Health

- Herd Health evaluation is a snapshot of one day in the life of a herd/flock
- Record keeping: simple as a calendar on the barn wall (daily events recorded) or computerized record system
- Animal Identification




Photos courtesy of Dr. Rowe

6



### Goat Herd Health




- Reproduction, Abortion & Ultrasonography
- Buck Management & Breeding Soundness
- Perinatal Mortality & Kidding Management
- Nutrition & Metabolic Disease Prevention
- Milk Quality & Quality Assurance
- Infectious Disease Control
  - CAEV, mycoplasma, CLA, Johnes, scrapie
  - Zoonotic Diseases
- Parasite Control

Slide courtesy of Dr. Rowe

7

### Goat Herd Health

- Ration formulation
- Feeds available
- Body condition assessment
- Feed bunk & Water management

- Space
- Shelter
- Ventilation
- Fencing
- Sanitation

**Infectious Disease Control**

- Mycoplasma
- CAEV
- CLA
- Johnes
- (Scrapie)
- Abortion agents

**Prevention**

- Vaccination
- Deworming
- Kidding /Doe
- Milk Quality
- Culling
- Disease Diagnosis & Treatment

**Veterinary-Client Relationship (VCPR)**


Photos courtesy of Dr. Rowe

8


## Goat Herd Health

- Ration formulation
- Feeds available
- Body condition assessment
- Feed bunk & Water management

- Mycoplasma
- CAEV
- CLA
- Johnes (Scrapie)
- Abortion agents



**Nutrition**



**Infectious Disease Control**

- Space
- Shelter
- Ventilation
- Fencing
- Sanitation


**Prevention**

**Veterinary-Client – Patient Relationship (VCPR)**


- Protocols
- Vaccination
- Deworming
- Kidding /Doe
- Milk Quality
- Culling
- Disease Diagnosis & Treatment

Photos courtesy of Dr. Rowe

9



## Nutrition



- Ration formulation
- Feeds available
- Body condition assessment
- Feedbuck management
- Water management
  - Clean (Bucks/Does)
  - Always available

- Identification of Cu, Se deficiency
- Other toxicities/ deficiencies
- Pregnancy toxemia
- Coccidia prevention
- Urolithiasis prevention

Slide courtesy of Dr. Rowe

10

## Feed Bunk and Water Management





Slide courtesy of Dr. Rowe

11


## Goat Herd Health

- Ration formulation
- Feeds available
- Body condition assessment
- Feed bunk & Water management

- Mycoplasma
- CAEV
- CLA
- Johnes (Scrapie)
- Abortion agents



**Nutrition**



**Infectious Disease Control**

- Space
- Shelter
- Ventilation
- Fencing
- Sanitation

**Prevention**

**Veterinary-Client – Patient Relationship (VCPR)**

- Protocols
- Vaccination
- Deworming
- Kidding /Doe
- Milk Quality
- Culling
- Disease Diagnosis & Treatment

Photos courtesy of Dr. Rowe

12

## Housing

- Space
- Shelter
- Ventilation
- Fencing
- Sanitation
- Feeding Facilities
- Watering Facilities

- Stress
- Parasites
- Pneumonia
- Predators
- Infectious disease
- Urinary tract health



Slide courtesy of Dr. Rowe

13

## Predator Prevention

- Fencing
- Guardian Animals
- Pets as predators




**Mortality- adult & kid  
Pregnancy loss  
Welfare**

Slide courtesy of Dr. Rowe

14

## Goat Herd Health

- Ration formulation
- Feeds available
- Body condition assessment
- Feed bunk & Water management



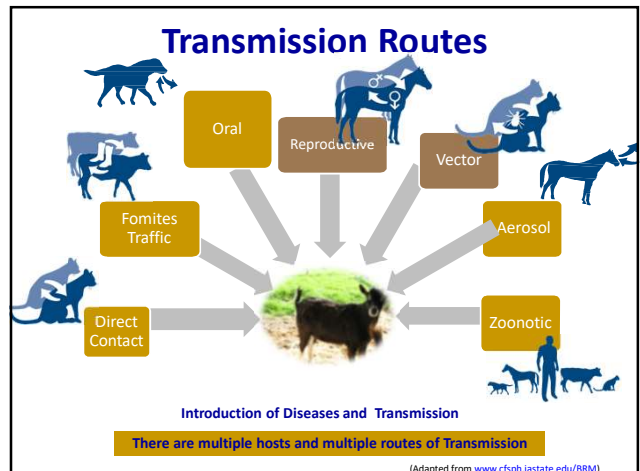
- Mycoplasma
- CAEV
- CLA
- Johnes (Scrapie)
- Abortion agents

Protocols

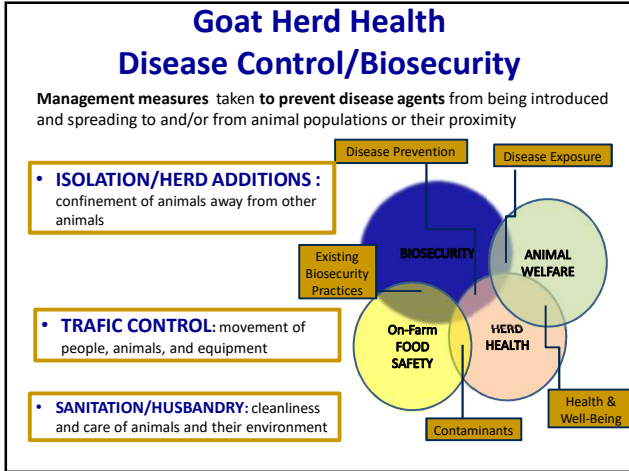
- Vaccination
- Deworming
- Kidding /Doe
- Milk Quality
- Culling
- Disease Diagnosis & Treatment

Photos courtesy of Dr. Rowe

15





16



17

### Disease Control Herd Additions



- **Before adding new animals:**
- Health status of the source flock/herd(s)
  - CAEV
  - CL
  - Mycoplasma
- Number of source herd should be minimized
- **High Health Herd:** Regularly monitors for diseases in the herd and keeps records

18

### Disease Control Herd Additions (cont.)

- **Quarantine** all newly acquired animals or reintroduced animals returning from exhibitions
- Isolate new animals **for 30 days** (at least **15 days**)
- **Isolation areas:** buildings and pens should not share the same airspace as resident animals
- **Observation of the animals:** signs of disease
- Animals can **be tested for diseases** of concern
- **Preventive Health Measures:**
  - Vaccination
  - Deworming
  - Foot trimming






Photos courtesy of Dr. Rowe

19

### Disease Control Herd Additions (cont.)

- **Uniform age groups**
  - Different animal ages in the same pen/barn increases the opportunity of spreading disease
  - Older animals may carry diseases to which younger have not developed an immunity





20

## Disease Control Traffic Control

**Movement of people, animals and equipment**

- People & Equipment can carry pathogens
- Avoid exposure of the owner/employees to other flocks or other livestock




• Q Fever, CAE, CL, Orf, *Toxoplasma*, foodborne pathogens


21

## Disease Control Traffic Control (cont.)

- **When visit other farm / Visitors**
- Restrict access visitors (e.g., barns, pastures, kidding areas)
- Strict sanitation standards
- Disposable boots or boot washing stations
- Wear protective clothing
- Foot bath







**Vehicles**

- Clean and disinfect your vehicle after buying feed & supplies, returning from events

22

## Disease Control Sanitation: Equipment

**Equipment**

- Sources of infection
- Clean and disinfect equipment and don't share equipment & feed from neighbors / healthy & sick Animals

➔

**Facilities**

- Pens, housing, working facilities

**Equipment**

- Trimmers, shears, brushes, feeders, buckets, tattoo needles



23

## Disease Control Sanitation: Cleaning & Disinfection

Pre-Cleaning Removal of debris (aka remove the dirt)

Apply soap (aka wet the dirt with a foamy soap)

Wash the dirt away

Let the surface drain and dry

Apply disinfectant (Right disinfectant, concentration, consistency, time)

80%


20%

(Slide courtesy of Dr. Maurice Pitesky)


24

### Disease Control Sanitation


- Wear **personal protective equipment (PPE)**
  - Gloves
  - Dedicated clothing (coveralls) & boots
  - Footbath (?) or bucket w scrub brush
- **Wash hands after removing outwear, gloves, boots**



**PROTECTIVE  
BOOTS &  
CLOTHING  
REQUIRED  
UPON ENTRY**



- Kidding
- Milking Routine
- Kids Rearing



25

### Disease Control Sanitation: Wildlife & Pest Control

- **Prevent contact with free roaming animals** (wildlife, cats, dogs, etc.)
- **Minimize bird contact and nesting** in the farm/barn: discourage bird nesting and roosting
- **Rodent control program** : Put **traps or bait stations** around the the barn, beams, walls and ceiling routes
- **Secure all feed storage areas and clean up** to minimize access by pests





- Can carry diseases that can affect small ruminants and humans (e.g., *Toxoplasma*, *Salmonella*, *Leptospira*)




26

### Disease Control Record Keeping

- **Herd Additions**
- **Individual/Group Disease Events**
- **Feed changes**
- **Milk production records**
  - DIH tests
  - Milk bulk tank test records
  - Somatic Cell Count Records (bulk tank, individual)
  - Mastitis events
- **Breeding Records**
  - Pen/individual
  - Due date
- **Kidding Records**
- **Body Condition Scores**
- **Test Results**
  - CAE, Johnes test
  - Mastitis Cultures
  - Fecal tests
  - Diagnostic lab reports



*Goat Forms*



Adapted from <http://www.oakhillhomestead.com>  
<http://www.livestockmanagers.com/goatmanager/>

27

### Infectious Disease Control



- **Mycoplasma**
- **Caprine Arthritis Encephalitis Virus (CAEV)**
- **Caseous Lymphadenitis (CLA)**
- **Johnes**
- **Q Fever**
- **Abortion agents**

28

## Caseous Lymphadenitis (CLA)

- *Corynebacterium pseudotuberculosis*
- Goats & sheep
- **Abscessation of** peripheral lymph nodes (under the jaw, front of the shoulder, in the lower flank)
- **Internal Abscesses:** Lymph nodes deep in body (chest cavity)

**Transmission**

- Direct contact with infected animals & contaminated environment (soil, bedding, water, equipment, etc.)
- Dairy: milking machine
- Survive in the soil for months to years





Photo courtesy of Dr. Rowe

29

## Caseous Lymphadenitis (CLA) Prevention



- New animals from CL free herd
- Fly control
- Disinfection of area/equipment: shearing equipment, combs, needles, tattoo equipment, milking equipment
- Detention of environment sources (feeders, fences, pens, trailers, etc.)
- Animals with abscesses about to rupture:
  - Isolation of the animals
  - Veterinary care/Treatment
- Vaccination strategies


30

## Caprine Arthritis-Encephalitis Virus Infection (CAEV)

- *Lentivirus*
- Goats (++) and Sheep (-)
- Chronic disease, Lifelong infection

**Transmission**

- From infected dams to their kids: colostrum or milk
- Direct contact, exposure to contaminated environment: equipment, milking parlor




31

## Caprine Arthritis-Encephalitis Virus Infection (CAEV)

**Adults:**


- Polyarthritis
- Hard udder/Agalactiae
- Pneumonia
- Weight loss



(courtesy of Dr. Rowe)

**Kids:**

- Progressive paresis, Neurological signs (Leukoencephalomyelitis)
- Slow grow to minimal weight



(courtesy of Dr. Rowe)

32


### Caprine Arthritis-Encephalitis Virus Infection (CAEV) Prevention

#### Eradication/Prevention Introduction



- New animals from CAE free herd
- Quarantine and testing of new animals
- Testing & Removal
- Testing & Segregation
- Disinfection of the equipment shared between negative and positive (phenolic & quaternary ammonium compounds)

#### Kids –Pasteurized Rearing program

- Permanent isolation of kids beginning at birth
- Feeding of heat-treated colostrum (113F for 60 min) & pasteurized milk



(courtesy of Dr. Rowe)






33

### Q Fever

- Endemic in the US
- **Direct contact** with infected animals (urine, feces, birth fluids) and contaminated environment (straw, clothing)
- **Inhalation** of aerosolized bacteria; other (milk, vectors)

**Volunteers will be used to cuddle, feed goats at Virginia farm**

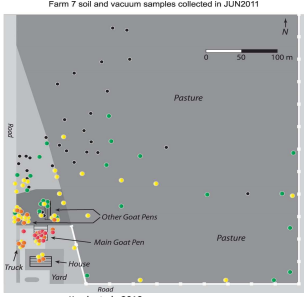




34

### Q Fever

- Ubiquitous & persistence in the environment

Farm 7 soil and vacuum samples collected in JUN2011



Kersh et al., 2013

35

### Aerosol – Q Fever

**Prevention:**

- Remove carcasses, aborted fetuses, placentas promptly
- Stop moving or selling animals
- Avoid high density of goats (kidding season)
- Control dust







36

## Aerosol – Q Fever

**Prevention:**


- PPE: gloves, wear masks when handling infectious animals or infected tissues (placenta, fetus, birth fluids) or cleaning the barn


37

## Goat Herd Health

- Ration formulation
- Feeds available
- Body condition assessment
- Feedbunk & Water management




**Nutrition**




**Infectious Disease Control**

- Space
- Shelter
- Ventilation
- Fencing
- Sanitation



**Housing**



**Prevention**  
**Veterinary-Client-Patient Relationship (VCPR)**

- Mycoplasma
- CAEV
- CLA
- Johnes
- (Scrapie)
- Abortion agents

**Protocols**

- Vaccination
- Deworming
- Kidding /Doe
- Milk Quality
- Culling
- Disease Diagnosis & Treatment

Photos courtesy of Dr. Rowe

38

## Goat Herd Health Veterinary-Client-Patient-Relationship (VCPR)

- Essentially means that the veterinarian is familiar with the client and his livestock
- Allows the veterinarian to write a prescription for medications, without actually examining every sick animal
- Keeping medications on hand allows prompt treatment of sick animals
- Work with your local veterinarian





Slide Courtesy of Dr. Bauman

39


## Resources

**Local Veterinarian (VCPR)**




**Diagnostic Lab**


LOCATIONS/CONTACTS



**UC ANR Cooperative Extension**



University of California  
Agriculture and Natural Resources



<http://cahfs.ucdavis.edu/>

40

## VET MED EXT Resources

**VETERINARY MEDICINE EXTENSION**  
 Working as the UC Davis School of Veterinary Medicine and Extension's Extension Specialist, I provide information and resources to help you succeed in your agricultural business.

**OUR PROGRAMS**  
<http://www.vetmed.ucdavis.edu/vetext/>

**OUR FACILITY**  
[http://ucanr.edu/sites/small\\_farms/](http://ucanr.edu/sites/small_farms/)

**UC CE Poultry**  
<http://ucanr.edu/sites/poultry/>

41

## Research Survey

2018 Small-scale and Backyard Livestock/Poultry Survey: Workshop Series

### I. Demographics & General Information

1.1 In which California county is your backyard/premiel farm based?

1.2 Where is your property located?

- Urban (over 250,000 inhabitants)
- Town (city <250,000 and surrounded by a metropolitan area)
- Suburban (periphery of metropolitan area and close to agricultural land or other open space)
- Rural
- Other (specify):

1.3 How would you describe the reason(s) why you raise livestock/poultry? Check all that apply.

- 4-H or FFA member
- Pets
- Backyard producer for personal use
- Backyard producer for sale of live animals
- Backyard producer for sale of animal products (e.g., eggs, fiber, meat, etc.)
- Small-scale farmer (livestock only)
- Small-scale diversified farmer (vegetables and livestock)
- Breeder
- Hobby/hobbyist
- Other (specify):

1.4 What is the average size of your herd or flock? Check all that apply.

	1-5	6-10	11-20	21-50	51-100	>100
Chickens						
Ducks						
Turkeys						
Goats						
Sheep						

42

## Healthy Animals, Healthy People Workshop

### Thank you for your attention!

**Alda Pires, DVM, MPVM, PhD, Dipl. ACVPM**  
 Urban Agriculture & Food Safety, Extension Specialist  
[apires@ucdavis.edu](mailto:apires@ucdavis.edu); 530 754 9855

43

## Parasites in Ruminants


Figure 1. The lifecycle of a gastrointestinal parasite. This image is courtesy of Virginia Tech Cooperative Extension.

- **Abomasal worms**
  - Haemonchus contortus (Barberpole worm): sheep, goats, cattle
  - Ostertagia (Brown stomach worm) (cattle)
- **Small Intestinal worms**
  - Trichostrongylus (Bankrupt worms)
  - Cooperia
- Protozoa (coccidia)
- Trematodes (flukes)
- Cestodes (tapeworms)


Adapted from MA&VA Cooperative Extension Parasite Control Fact Sheet

44

### Parasites in Ruminants *Prevention*




This sheep is getting no nourishment but plenty of parasites in this situation. Photo: Linda Coffey, NCAT



Grazing buffer zones, lanes between tree rows, and riparian edges can help maintain the landscape while making these areas productive parts of the farm. Photo: Joan Burke, USDA, ARS

- Pasture Rotation (?)
- Avoid overgrazing
- Animal Management
- Multi-species grazing
- Rotation between different anthelmintics
- Herd dogs (parasites)

45




### Vaccinations for all goats


- **Clostridium perfringens type C & D (Enterotoxemia)**
- **Tetanus toxoid**

### Supplements

- **Vitamin E / Selenium**



46



### Optional Goat Vaccines (use in disease control)

- **Soremouth (Contagious ecthyma)**
- **Caseous Lymphadenitis**
- **Contagious Abortion**
- **J-5 E. coli, respiratory vaccines**

Slide courtesy of Dr. Rowe

47

### Common Kid Problems

- Heat Damaged Colostrum
- Colicbacillosis
- Cryptosporidiosis
- Floppy Kid Syndrome
- White Muscle Disease
- Pneumonia
- Coccidiosis



48

### Interrupting Kid Disease

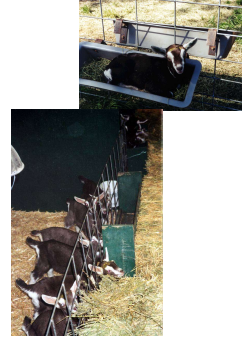


- Stop movement into facility
- Disposable housing
- Stop traffic flow
- Stop fomite movement
- Disinfect equipment

49

### Cocciosis Control

- Feeder design & hygiene
- Age segregation
- Coccistats
  - Milk decco
  - Feed decco
  - Lasalocid, Rumensin
  - Sulfadimethoxine



Slide courtesy of Dr. Rowe

50

The kids have disobeyed the orders to avoid contamination of the feeders



Slide courtesy of Dr. Rowe

51

### Juvenile Diseases Transmitted by Milk/ Colostrum



- “Contaminated” milk
  - Colibacillosis
  - Cryptosporidiosis
- “Infected” milk
  - Mycoplasmosis
  - CAEV (CNS form)
- Denatured colostrum

Slide courtesy of Dr. Rowe

52

### Common Sources of Neonatal Milk Exposure



- Accidental or planned nursing
- Pooled colostrum/milk
- Colostrum from infected donor
- Pasteurization failure
- Accidental nursing of other does

Slide courtesy of Dr. Rowe

53

### Adult-Onset Diseases Transmissible by Milk/Colostrum



- CAEV
- Mycoplasmosis
- Johnes



Slide courtesy of Dr. Rowe

54

### Adult - Oral Milk Exposure



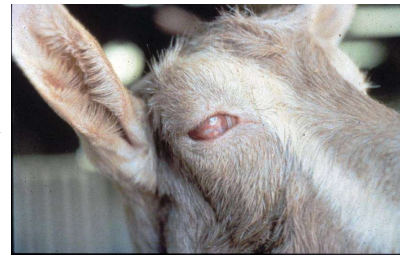
- Milk buckets in parlor
- Milk handling at shows
- Milk contamination of feeding equipment
- Cross-contamination of raw/disinfected equipment/fomites

Slide courtesy of Dr. Rowe

55

### Other Localized Infectious Diseases

Pinkeye  
Footrot  
Ringworm



Slide courtesy of Dr. Rowe

56