3RD ANNUAL SMALL RUMINANT SHORT COURSE & RAM AND BUCK TEST SALE

September 20-21, 2024

Gainesville, Florida

UF IFAS UNIVERSITY of FLORIDA | UF ANIMAL SCIENCES

UF College of Veterinary Medicine UNIVERSITY of FLORIDA

UF IFAS Extension UNIVERSITY of FLORIDA

UF | IFAS Extension
UNIVERSITY of FLORIDA

Welcome to the 3rd annual UF Small Ruminant Short Course!

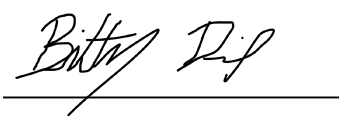
The UF Small Ruminant Short Course and Ram/Buck Test Program Committee, the Department of Animal Sciences, the College of Veterinary Medicine and UF/IFAS Extension would like to welcome you to our third annual joint event. We look forward to this program in anticipation of delivering a premier educational event for small ruminant producers in the southeastern United States. Whether you are a small or a large producer, we hope that you enjoy the program and learn about the small ruminant industry's future direction, best management practices, and new information about specific production and management tools that may impact your small ruminant enterprise.

We are very excited to have a two-day conference event that combines an exchange of knowledge with information shared during lectures, research updates and demonstrations. In order to expand hands-on learning opportunities, we added a series of three pre-conference seminars this year which takes place on Thursday, prior to the full conference kick-off. We are privileged to have outstanding individuals speaking at the UF Small Ruminant Short Course. It is our hope that the knowledge exchanged will contribute to the advancement of the Florida small ruminant industry and beyond. We hope that you enjoy our program!

The 3rd annual UF Small Ruminant Short Course is an event that requires immense coordination and dedication from many individuals to accomplish the final program. The UF Small Ruminant Short Course Organizing Committee is very grateful to the faculty, staff, students, and volunteers who are essential in the planning and execution of this event.

Thank you for choosing to attend the 3rd annual UF Small Ruminant Short Course. We hope the program exceeds your expectations and provides you with valuable information to impact your small ruminant enterprise.

Best Regards,



Brittany N. Diehl, DVM, MS
Clinical Assistant Professor
Small Ruminant Extension Specialist
UF College of Veterinary Medicine

2024 Small Ruminant Short Course

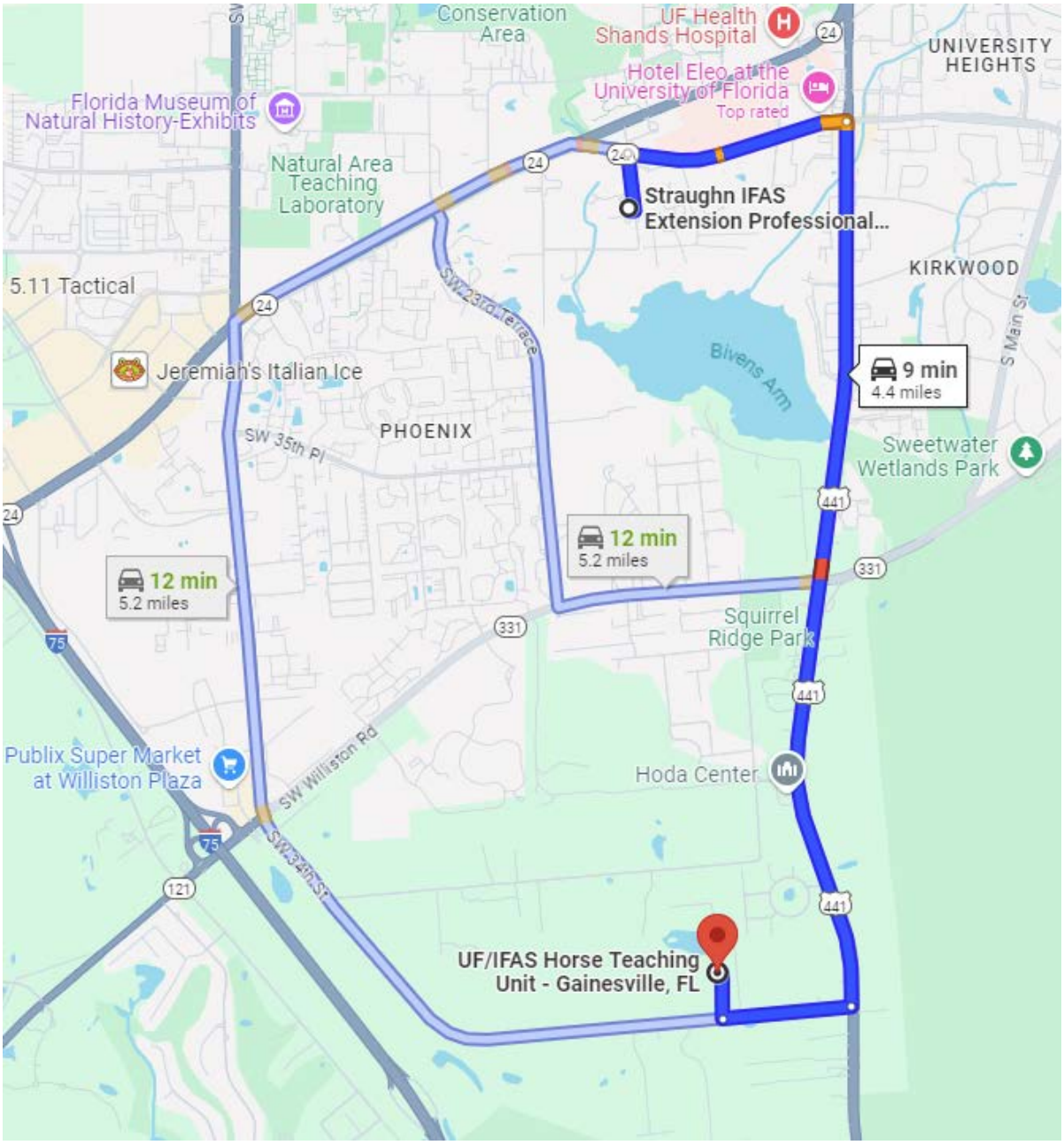
September 20 – 21, 2024

Presented by

UF/IFAS Department of Animal Sciences
UF College of Veterinary Medicine
UF/IFAS Department of Agronomy
UF/IFAS Extension

2024 Small Ruminant Short Course Committee

Brittany Diehl, Chair
Diwakar Vyas
Clay Whitehead
Matti Moyer
Megan Kelly
Savannah Linzmaier
Small Ruminant Extension Group



Straughn Professional Development Center Address: 2142 Shealy Drive, Gainesville, FL 32608

UF Horse Teaching Unit Address: 1934 SW 63rd Ave, Gainesville, Fl 32608

From Straughn Professional Development Center to Horse Teaching Unit:

- Depart the Straughn Center, turn left on Shealy Drive (0.02 mi).
- Go to stop light and turn right on SW 16th Ave (0.7 mi).
- Turn right onto US-441 S/SW 13th St (2.9 mi).
- Turn right onto SW 63rd Ave (0.4 mi).
- Turn right and destination is on left, UF/IFAS Horse Teaching Unit (0.1 mi)

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Please visit our webpage-page @ https://animal.ifas.ufl.edu/smallruminant/

Thursday, September 19

Pre-conference Seminars, Various Locations

UF IFAS UNIVERSITY of FLORIDA

SMALL RUMINANT PROGRAM

Pre-conference seminars are hands-on workshops aimed at providing in-depth exposure to specific topics, delivering practical knowledge and application, while connecting producers and specialists.

Pre-conference seminars will have a maximum capacity of 15 participants each. Pre-registration is required.

Transportation to each location is the attendee's responsibility, there will not be transportation provided. Meals are on your own on Thursday, September 19th.

Cost per session: $50/person

Option 1: Small Ruminant Carcass Evaluation & Processing

Instructor: Kyle Mendes, University of Florida
Description: Participants will have the opportunity to engage in hands-on instructional activities related to small ruminant meat carcass evaluation and processing.
Location: UF Meat Processing Center, 2250 Shealy Drive, Gainesville, FL 32611
Time: 9:30-11:00 AM EST

Option 2: Small Ruminant Pasture Management and Rotational Grazing

Instructor: Dr. Marcelo Wallau, University of Florida
Dr. Rocky Lemus, Mississippi State University
Description: Participants will have the opportunity to engage in hands-on instructional activities related to small ruminant forage production and management.
Location: UF Beef Research Unit, 9800 North County Road 225, Gainesville, FL 32609
Time: 12:30-2:30 PM EST

Option 3: Small Ruminant Veterinary Techniques

Instructor: Dr. Alejandro Grau, Grau Veterinary Services
Description: Participants will have the opportunity to engage in hands-on instructional activities related to small ruminant venipuncture, needle size and length determinants, injection techniques, orogastric tube placement, hoof trimming, FAMACHA scoring, and body condition scoring.
Location: UF Sheep Unit, 2108 Shealy Drive, Gainesville, FL 32608
Time: 3:30-5:30 PM EST

Friday, September 20

Location: Straughn Professional Development Center

7:30 - 8:30	Registration
8:30 - 8:45	Welcome *- Dr. Saqib Mukhtar, UF/IFAS Extension Associate Dean* *- Dr. Brittany Diehl, UF College of Veterinary Medicine*
8:45-9:30	Starting a Small Ruminant Enterprise – Selection and Production *- Dr. Joan Burke, USDA-ARS*
9:30-10:15	Sustainable Small Ruminant Grazing Systems *- Dr. Rocky Lemus, Mississippi State University*
10:15-10:35	Universal Feeders Refreshment Break
10:35-10:55	Can choline feeding during the breeding period improve the performance of sheep and the resultant lambs? *- Masroor Sagheer, University of Florida*
10:55-11:15	The interplay between host genetics and microbiota for enhanced resilience in sheep *- Dr. Fernanda Rezende, University of Florida* *- Andres Alvarado, University of Florida*
11:15-12:00	Small Ruminant Meat Selection, Grading & Marketing *- Kyle Mendes, University of Florida*
12:00-1:00	Cheifland Farm Supply Lunch
1:00-2:00	Integrated Management of Small Ruminant GI Parasitism *- Dr. Joan Burke, USDA-ARS*
2:00-3:00	Common Health Challenges in Small Ruminants *- Dr. Katelyn Menacho, Oak Hammock Large Animal Veterinary Services*
3:00-3:20	Nine Twenty Processing Refreshment Break
3:20-4:15	Small Ruminant Nutritional Requirements: Vitamins and Minerals *- Dr. Diwakar Vyas, University of Florida*
4:15-5:00	**Travel to UF/IFAS Horse Teaching Unit (HTU) 1934 SW 63rd Avenue, Gainesville, FL 32608**
5:00-6:00	Farm Credit of Florida Cocktail Hour & Trade Show UF Ram Test & Sale animals available for viewing
6:00	Dinner

Research Updates

Saturday, September 21

Location: UF/IFAS Horse Teaching Unit

8:30-9:00	Registration
9:00-9:15	Welcome *- Dr. John Arthington, UF/IFAS Department of Animal Sciences Chair*
9:15-10:00	Ram & Buck Test Data Overview *- Dr. Brittany Diehl, UF College of Veterinary Medicine* *- Clay Whitehead, UF Animal Sciences*
10:00-12:00	Short Rotations & Trade Show UF Ram Test & Sale animals available for viewing Business Planning & Financial Opportunities for Small Ruminant Operations *- Laura Bennett, UF/IFAS Extension Pasco, Sumter, Hernando Counties* *- Allie Williams, UF/IFAS Extension Hillsborough County* Fecal Egg Counts *- Kevin Korus, UF/IFAS Extension Alachua County* Pasture Management *- Paulette Tomlinson, UF/IFAS Extension Columbia County* *- Lizzie Whitehead, UF/IFAS Extension Bradford County* Pasture Weed Identification & Herbicide Application *- Mark Mauldin, UF/IFAS Extension Washington County* Lamb Cooking Demonstration *- Kyle Mendes, UF Animal Sciences* Small Ruminant Digestive System *- Alicia Halbritter, UF/IFAS Extension Baker County* Small Ruminant Nutrition *- Cassidy Dossin, UF/IFAS Extension Clay County* Soil Sampling *- Stephen Jennewein, UF/IFAS Extension Duval County* Tips & Tricks for Small Ruminant Transport *- Erin Jones, UF/IFAS Extension Suwannee County* Toxic Plants to Small Ruminants *- Ashley Stonecipher, UF/IFAS Extension Volusia County*
12:00-1:00	Lunch
1:00-1:15	**Travel to UF/IFAS Sheep Unit 2108 Shealy Drive, Gainesville, FL 32608**
1:15	FAMACHA Training - Advanced Registration Required *- UF/IFAS North Florida Livestock Agents Group (NFLAG)*

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Starting a small ruminant enterprise – Selection and Production

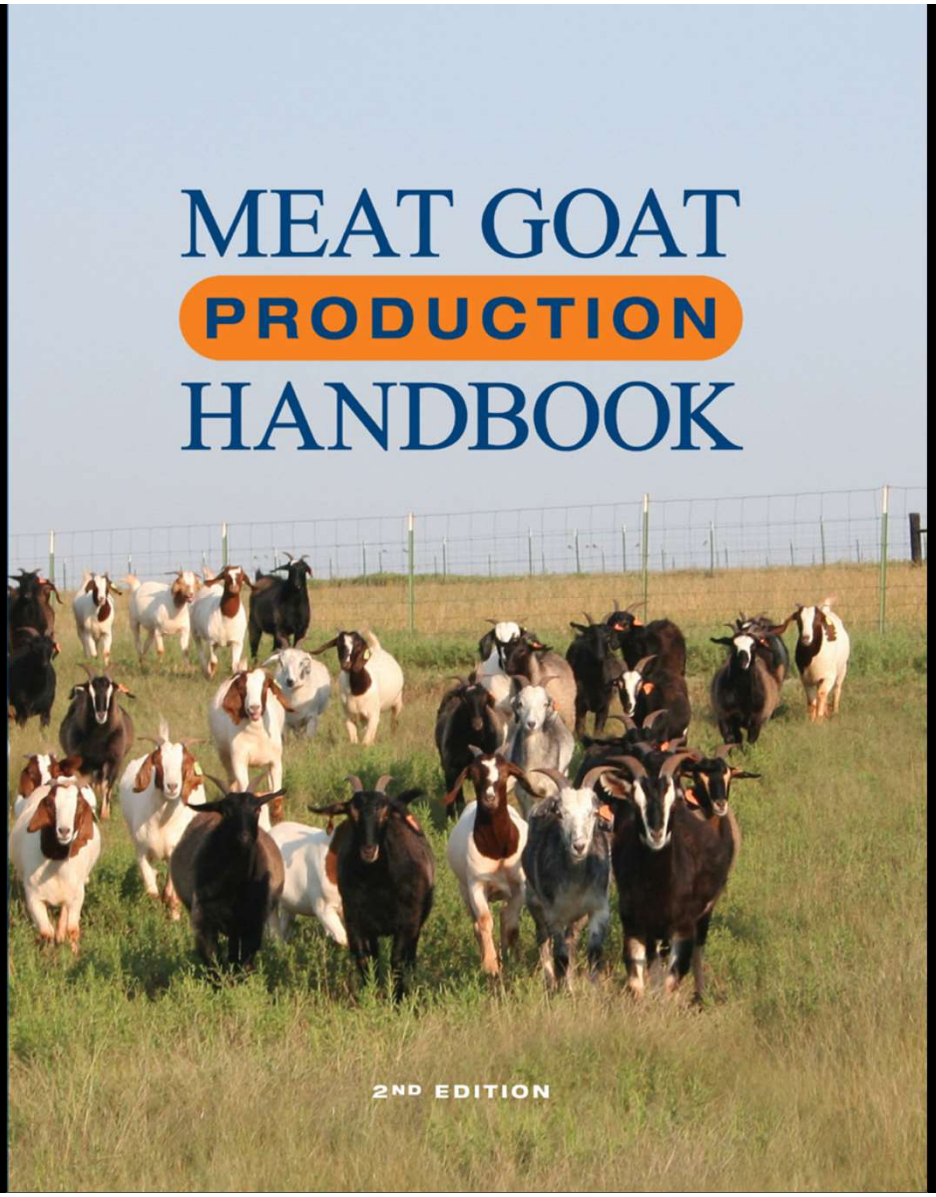
Joan M Burke

Research Animal Scientist

USDA, ARS, Dale Bumpers Small Farms Research Center
Booneville, AR

USDA United States Department of Agriculture
Agricultural Research Service

Mission: To develop scientific principles and technologies to enhance the profitability of small scale farms.


MEAT GOAT
PRODUCTION
HANDBOOK
2ND EDITION

Overview

- Desirable characteristics of small ruminants
- How do we achieve selection
- What is genetics?
- Determine breeding goals
- Records and data to record
- Considerations

Desirable characteristics

- Fast growth
- Heavily muscled
- Unassisted birth
- High number of offspring born/weaned
- Good milk production
- Easy keeper, robust
- Resistant to parasites/worms/disease
- Attractive (good bone structure, width, length, feet/legs)

How do we select animals? Do not judge a book by its cover!!

Need information

- Records, etc.

Need to understand genetic selection

- Genetic selection is based on phenotypic data, pedigree, contemporary group

Need to understand how environment, management and nutrition influence genetics

- Phenotype = Genotype x Environment x Management
- Some traits (low heritability) are more influenced by environment and management

Genetics

- Phenotype – What you measure
- Genotype – Genetic makeup. Does not change in an individual animal. Genes are translated into traits.
- Environment – climate, management, nutrition, etc.

Other lessons in genetics

Population mean. Measuring a trait and comparing with mean of other animals (within a population)

Contemporary group. Animals within a common management group. Example, lambs/kids born within a 30-day period.

Need to correct a trait for day of age (or season of birth, etc.). Lambs/Kids born later will be lighter in weight on same day as first born kid.

Goal of genetic selection or change is to increase animal production on the farm

- Increase the number of offspring/female exposed to ram/buck
- Increase efficiency of small ruminant production on the farm

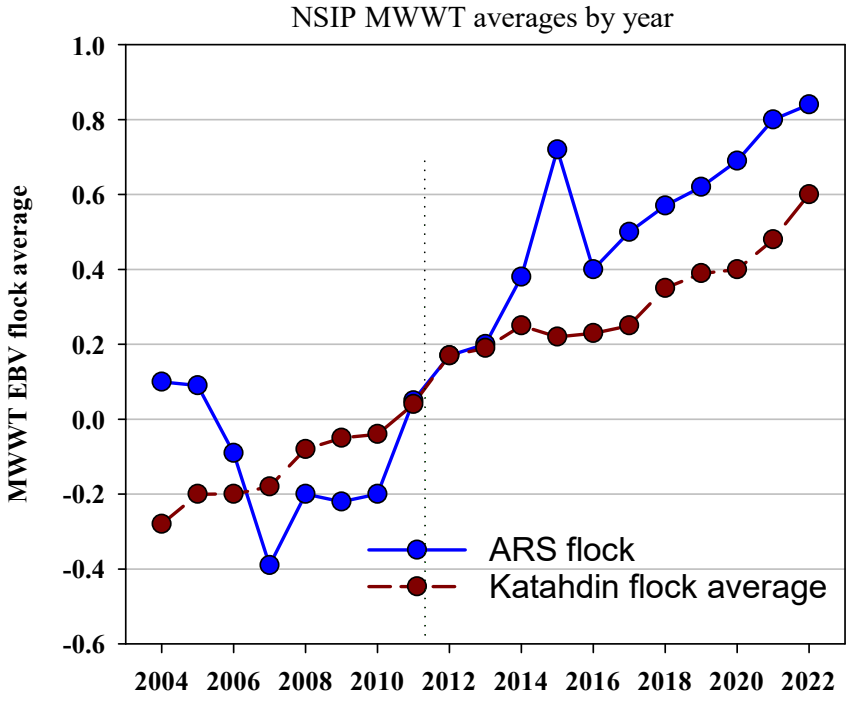
Example

- Single kid produced from a doe. Will grow faster and be heavier at weaning because it had more nutrition/milk. 45 lb. weaning weight/doe.
- Triplets produced from a doe. Won't grow as fast and individuals will be lighter at weaning. 30 lb. weaning weight x 3 = 90 lb. weaning weight/doe.

Through selection, improvements can be made with each new generation

- The ARS flock (blue solid line) has selected for maternal weaning weights (MWWT) in lambs (a reflection of genetic differences in milk production determined by weaning weight relative to parents).

- Note: Sheep and goat flocks in the U.S. can collect data (birth, weaning and post-weaning weights) on all animals and submit to the National Sheep Improvement Program which calculates Estimated Breeding Values based on individuals and pedigree.



First, determine breeding goals

- In ARS flock, first priority is parasite resistance because you cannot sell a dead lamb.
- Second is maternal weaning weight – ewes need to be able to produce enough milk for lambs on pasture
- Then weaning and post-weaning weights are important.
- Prolificacy is next - not highly heritable, but want at least average
- The more traits selected, the slower the progress. An index helps to make genetic gains in economically important traits.

Production traits – what we measure

- Fertility – getting bred to 1st cycle
- Prolificacy – number of offspring born/**weaned**
- Milk production – estimate by growth of lambs/kids (or actual milk production in dairy animals)
- Growth – body weights over time or average daily gain; gain per pound of feed
- Health – parasites, feet, mastitis, etc.
- Carcass traits – eye muscle depth, dressing percentage

Need to consider efficiency of production

- Ratio of outputs (lambs/kids marketed) to inputs (operating costs, labor, feed, cost of replacements).
- As an example, consider 2 does with same output, but one doe required more feed or health inputs. Or two does had same resources, but one had lower litter weight. She would be less efficient.

How to practice selection?

- Decide which animals will be kept for breeding and which sold for market
- Keep in mind how many kids to raise/produce – need to know current and target lambing/kidding rate
- How long will breeding animals stay in production?
- Culling rate
- Mating – matching females to sires (or AI), from within herd or purchased.

How can farmers measure phenotypes?

- Record keeping
- Phenotype – Indication of genetic merit
- Must collect DATA (body weights, death loss, FEC), make observations, examine disposition and behavior
- Ongoing process

Data to record

- Must have animal ID (tags, tattoo).
- **Pregnancy %** = No. exposed females pregnant or lambed or kidded/No. exposed X 100
- **Lambing/Kidding %** = No. offspring born/No. dams exposed X 100
- **Lamb/Kid death loss** = No. died/No. exposed X 100

Data to record

- Weaning weight and litter weaning weight. Adjust for 90-day weight (see table).
- **Average daily gain** (ADG) = weaning weight – birth weight/weaning age.
- **90-Day Weight** = (ADG X 90) + birth weight x (adjustments for litter size X age X sex) (see Table)
- **90-Day Weight** (if no birth wt) = (weaning wt/weaning age) X 90

Table 14-1. Goat 90 Day Weaning Weight Adjustment Factors.

Effect	*Group*	*Adjustment Value*
Litter Size		
born – raised	**1-1**	**1.00**
	1-2	**1.14**
	2-1	**1.04**
	2-2	**1.18**
	3-1	**1.08**
	3-2	**1.23**
	≥3-≥3	**1.27**
Age of Dam		
(years)	1	1.10
	2	1.09
	3+	1.00
Sex of Kid		
(weaned)	Buck	1.00
	Doe	1.11
	Wether	1.08

Source: http://sheepandgoat.com - David R Notter, PHD, Virginia Tech

Data to record

- Weaning weight ratio = (90-day wt/90-day herd weight average) X 100
- A ratio of 100 is equal to the group average. A kid with a weight ratio of 122 is 22% heavier than the group average. A kid with a ratio of 91 is 9% lighter than the group average.

Other concepts to consider

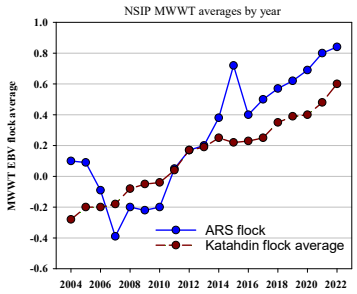
- **Randomness**. Breeding predictions are based on probabilities. Most economically important traits are polygenic (controlled by several genes). Tremendous genetic variability exists, especially in unrelated animals. The randomness of inheritance limits our ability to control the outcomes of mating. Can be difficult to know which traits will be expressed from sire and dam.
- **Heritability**. An estimate of the degree of variation in a phenotypic trait in a population due to genetic variation between individuals. It is the proportion of a trait not explained by environment (nutrition, management, etc.) or random chance.

Heritability estimates from sheep research with implications for meat goats

Trait	Heritability, %
Doe fertility	5-10
Kids born/doe kidding	10
Scrotal circumference	35
Age at puberty	25
Kid survival	5
Weight of kid weaned/doe exposed	20
Birth weight	3 - 36
90-day weight	25 - 30
Post-weaning gain	40
Carcass weight	35
Loin eye area	35
Dressing percentage	10
Milk yield	30 - 61

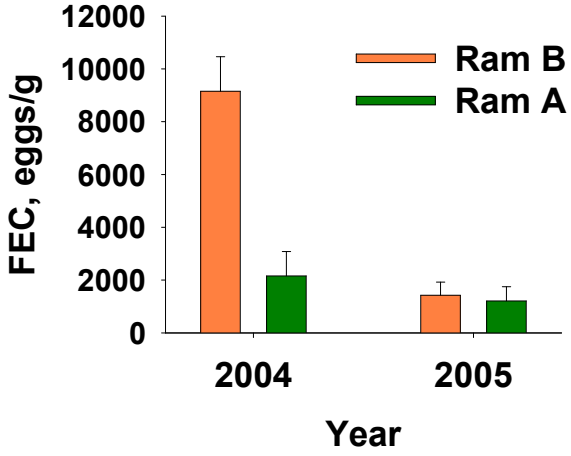
Adapted from WR Getz, Meat Goat Handbook, 2005

- Heritability estimates are determined within breeds and populations of animals and can vary based on diversity of population and other factors, and can change over time along with selection.
- Focus on moderately and highly heritable traits.
- Reproduction and survival traits are lowly heritable.



Using genetics for selection of parasite resistance

- **An animal's ability to resist parasites is heritable (0.18 - 0.23)**
- **USDA, ARS progeny of sires have been evaluated since 2004 for parasite resistance (FEC) and tolerance (PCV and FAMACHA), growth, and maternal traits.**

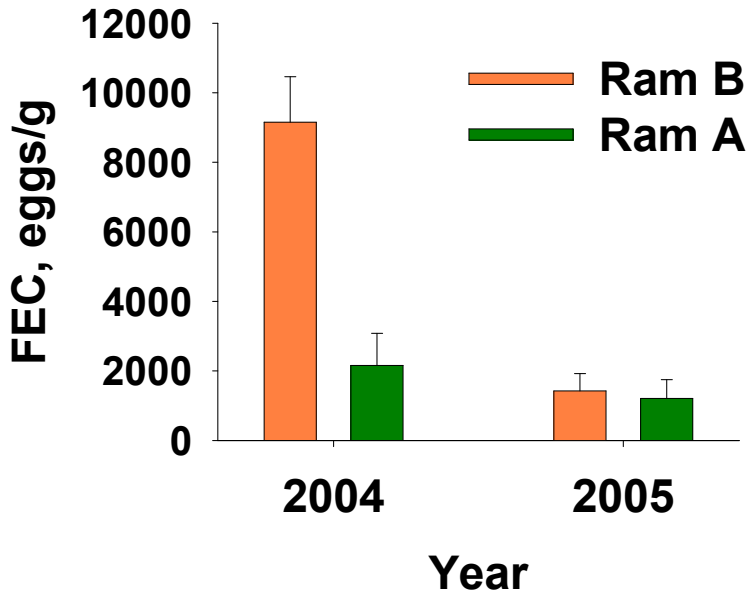


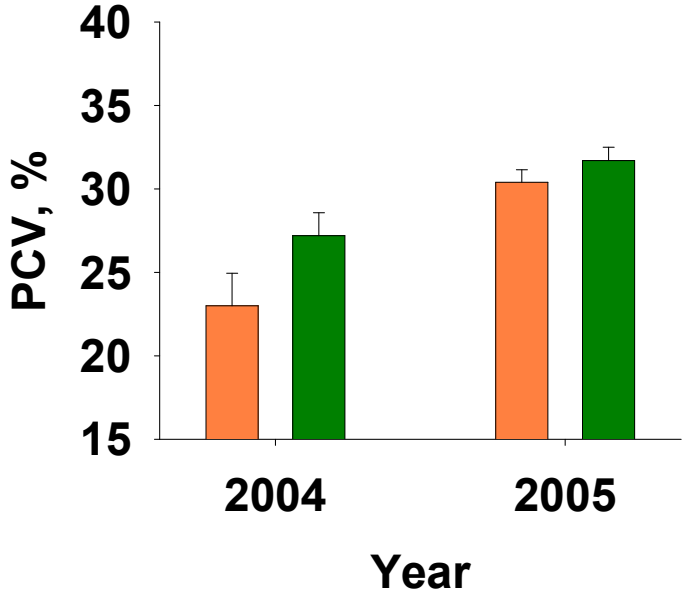
USDA United States Department of Agriculture
Agricultural Research Service

FEC and PCV of offspring sired by Katahdin rams A or B at 120 d of age (Burke & Miller, 2008 Vet. Parasitol. 153, 85)

Ram A:
WWEC = -21
PWEC = -3

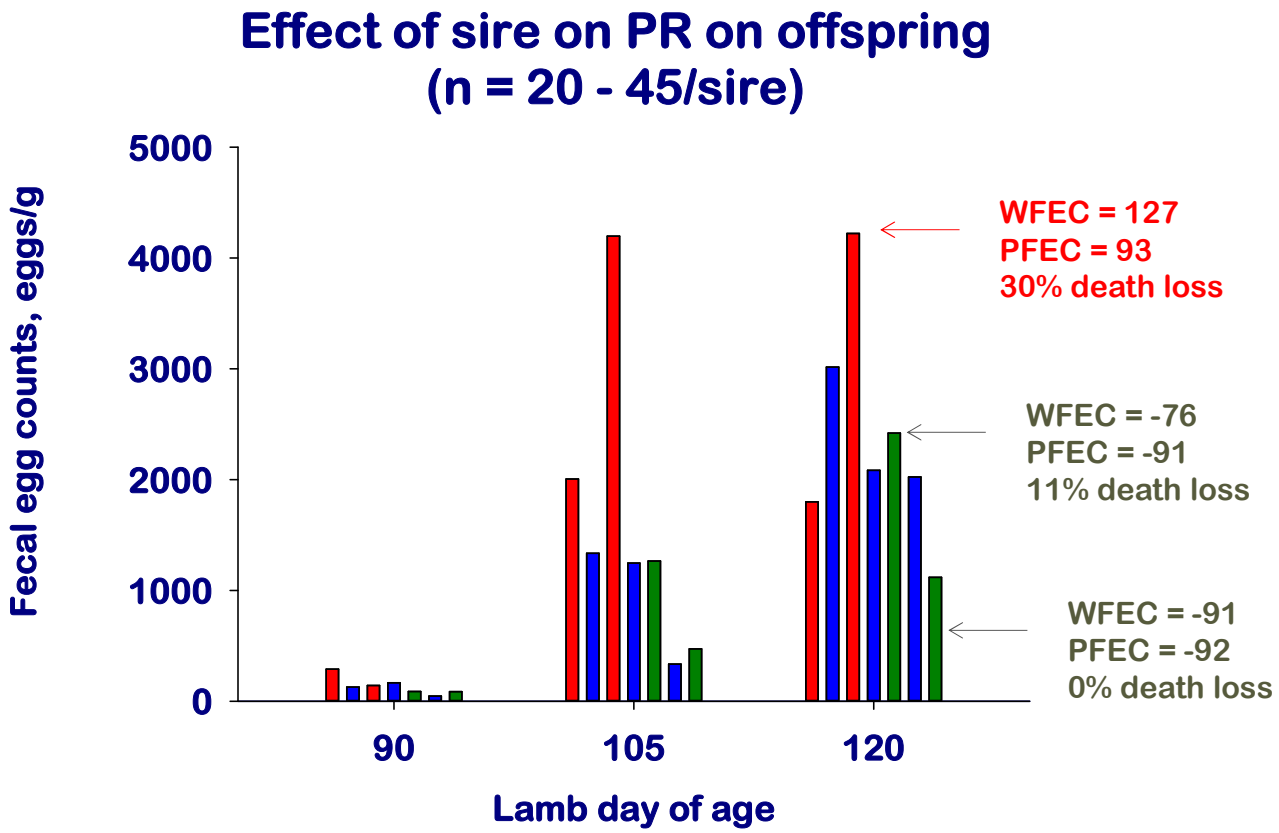
Ram B:
WWEC = +178
PWEC = +119





USDA United States Department of Agriculture
Agricultural Research Service

Comparing offspring FEC among sires



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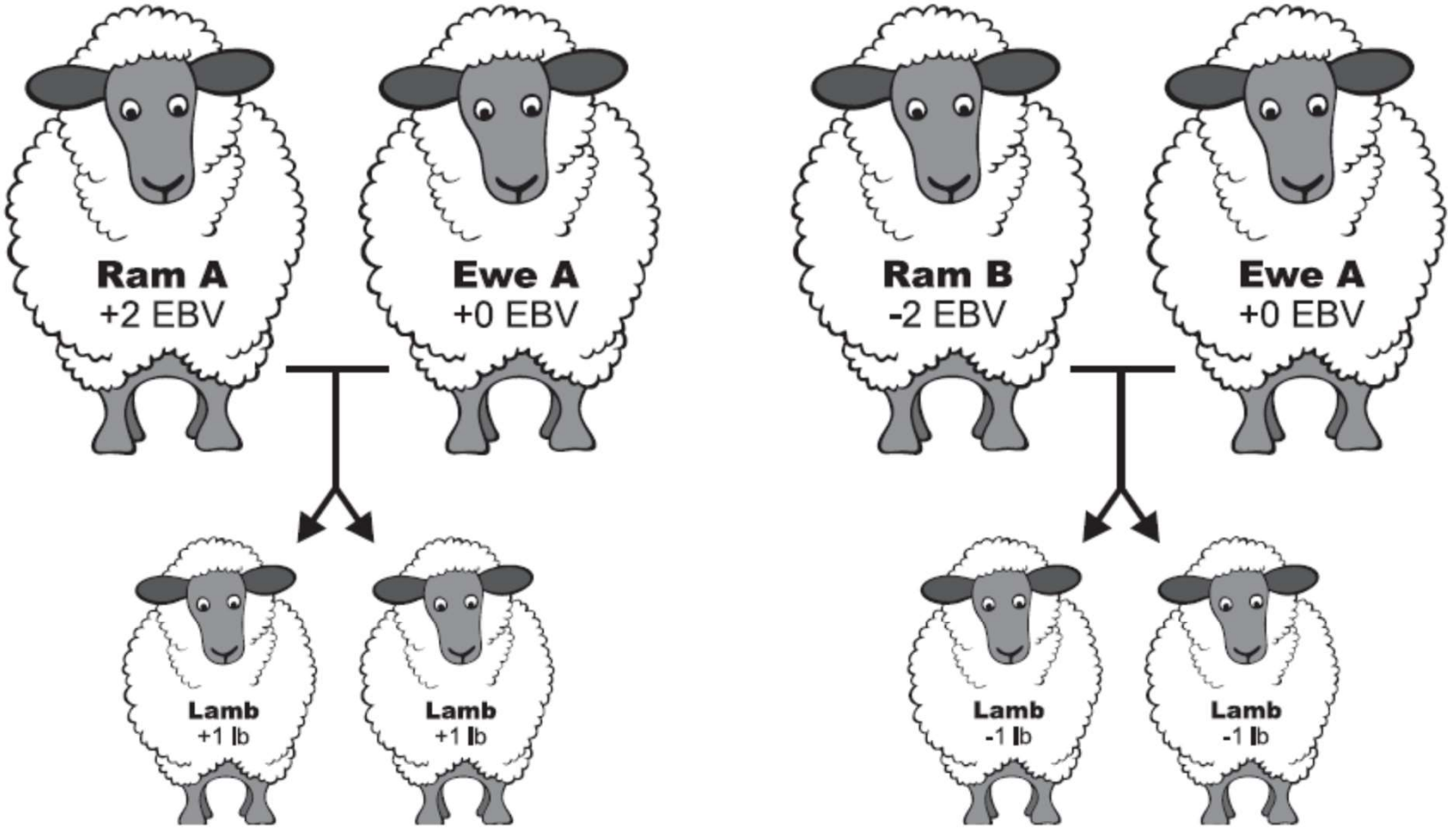
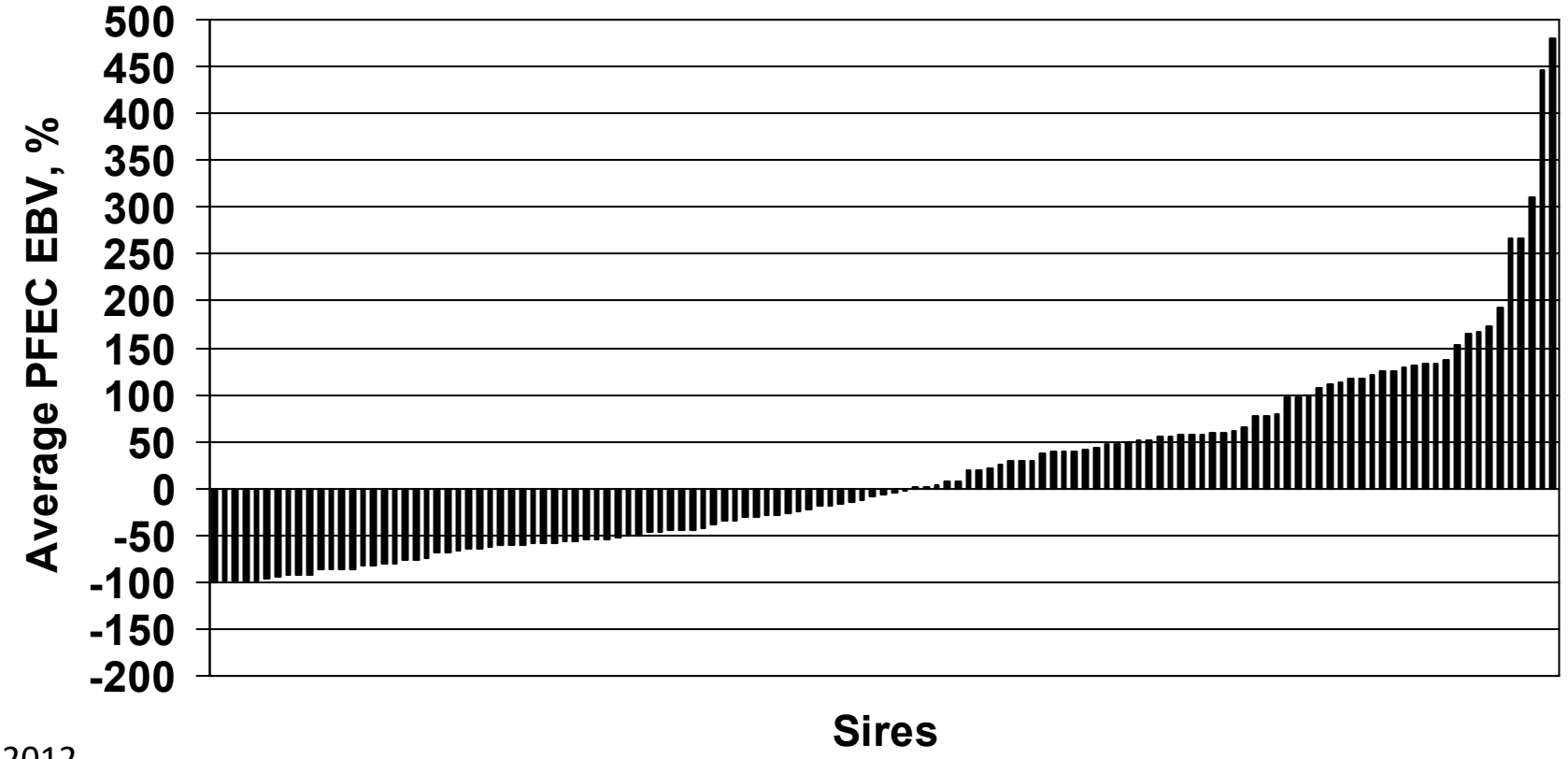


Figure 1. Example of differences in lamb weaning weight from Ram A and Ram B.

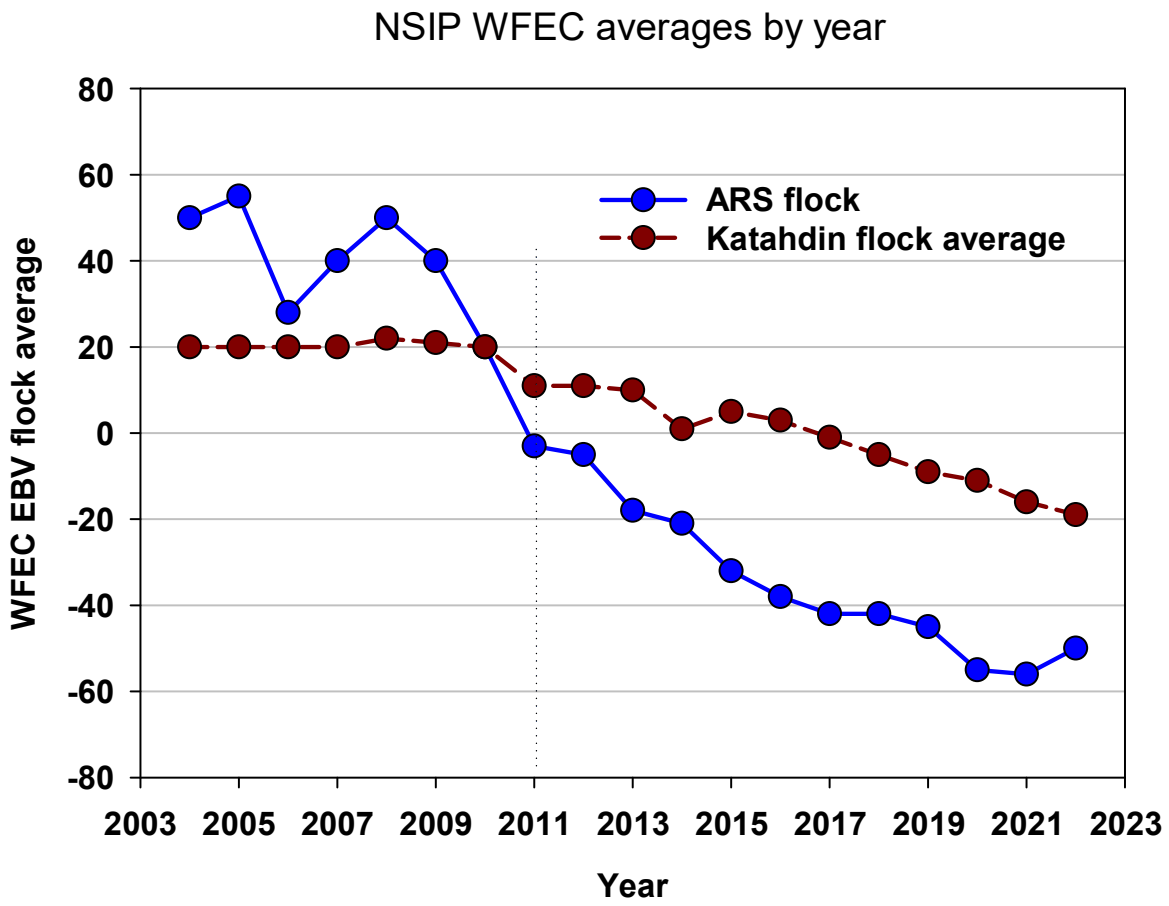
R. Redden, Understanding sheep estimated breeding values, NDSU, www.ag.ndsu.edu

Average PFEC EBVs by sires--sires with at least 10 and minimum accuracy of 0.75 for WFEC or PFEC EBVs (N = 127)



D. Notter, 2012

Genetic Trend for ARS flock



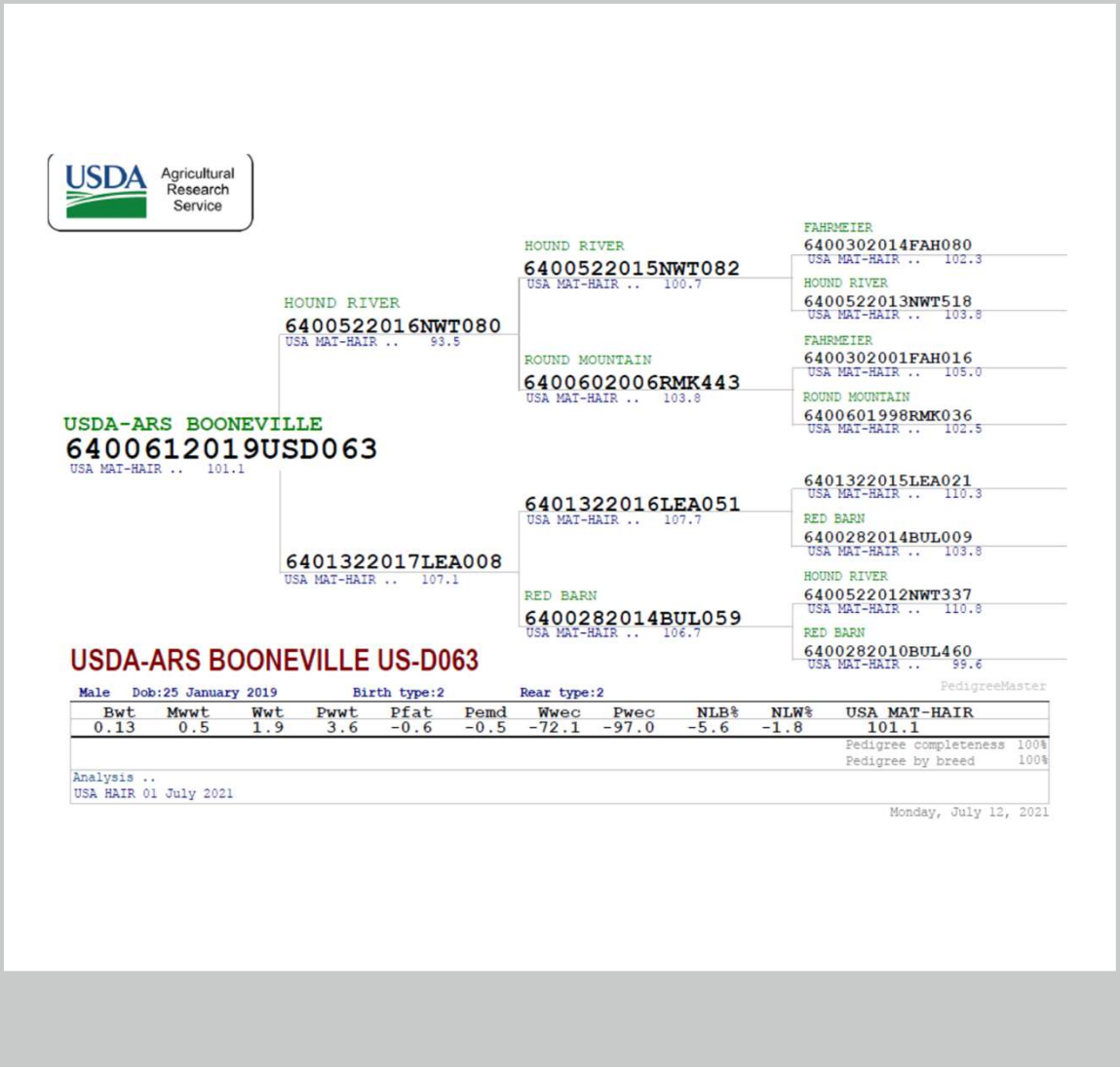
Consequences of selection for parasite resistance

- **Selection for parasite resistance does not occur in a vacuum.**
- **We (and others) found favorable genetic correlations between FEC and body weight in Katahdins (Ngere et al., 2018; Notter et al., 2018). This means that heavier lambs had lower FEC.**
- **Also found were genetic antagonisms with maternal traits such as prolificacy.**
- **Wool traits: there are favorable genetic correlations between FEC and fiber diameter, but unfavorable with clean fleece weight in SA Merino (Cloete et al., 2007) or small genetic correlations between PR and wool traits (Cunha et al., 2024).**
- **Dairy: There were unfavorable genetic correlations between FEC and milk yield in dairy goats (Heckendorn et al., 2017).**

USDA Agricultural Research Service

Consequences of selection for parasite resistance

- **PR may impact other immune responses.**
- **Type of infection influenced genetic correlations – more strongly positive with natural infections (Hayward, 2022 meta-analysis).**
- **However, breeding programs that consider multiple economically important traits can result in genetic improvements in all traits simultaneously.**
- **Genetic index traits consider important traits dependent on breed goals. Katahdin includes lamb BW, maternal weaning weight, prolificacy. Considering adding FEC EBV.**



Pedigrees

- Written record of ancestry
- Importance – particular lines of more productive animals will likely be more productive.
- Need performance records on pedigrees!

Distorted breeding objectives

- Competition among breeders
- Overselling traits such as color, ancestry, mature weight
- Not taking into consideration production traits

Strive for balance

- Selection for one trait at the expense of others is not balanced.
- Selection of 2-3 traits with other traits average or better reaches balanced goals.

Things to keep in mind

- Purchase animals from farms that are similar to yours in climate, environment, management, feeding/nutrition, care.
- Keep the end user in mind – consumer, butcher, feeder, etc.

MISSISSIPPI STATE UNIVERSITY™

EXTENSION

Center for Forage Management and Environmental Stewardship

Sustainable Small Ruminant Grazing Systems

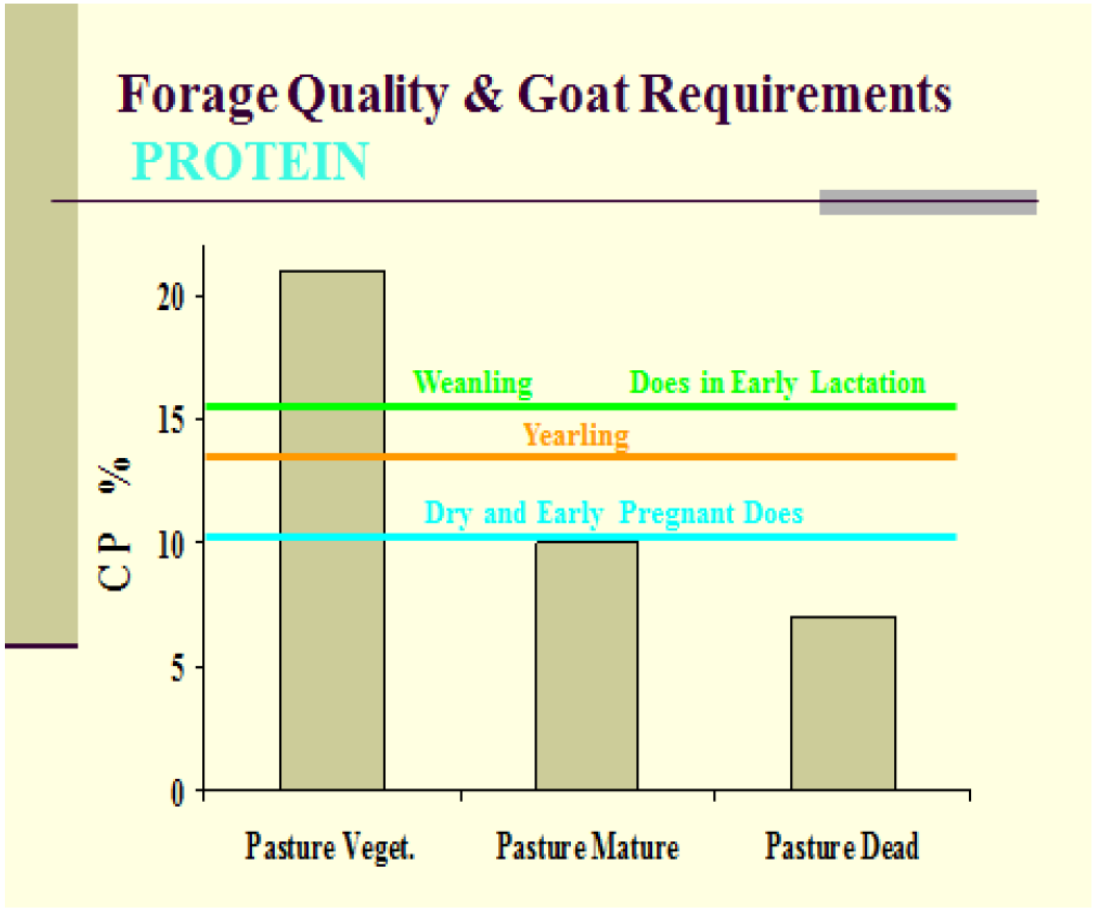
Rocky Lemus
Professor and Extension Forage Specialist
Center for Forage Management & Environmental Stewardship
Mississippi State University Extension Service
September 20, 2024

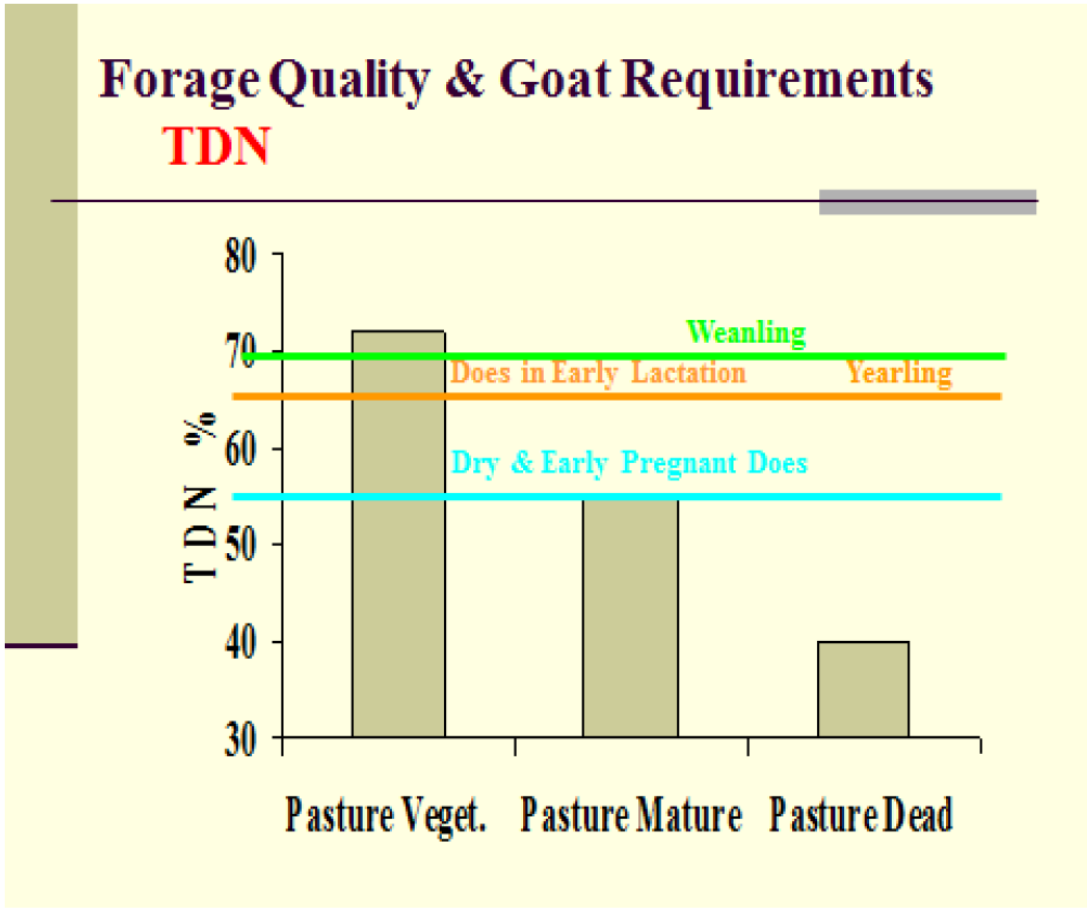
The Role of Forage Systems

- Ruminant livestock production systems are most efficient if:
  - There is maximal reliance on fresh plant material consumed by the animals
  - Minimal use of harvested forage or other supplemental feedstuffs.

- ***Challenges and Considerations***
  - Seasonal growth patterns of forage and browse plant species.
  - Varying environmental conditions.
  - Changes in nutrient and energy requirements of animals in accordance with stage of production.
  - Changes in climate with variable conditions and shifting in temperature and rainfall averages.

- Possibilities to mitigate changes
  - The use of monocultures of annual or perennial cool- and warm-season grasses and legumes in different areas.
  - Mixtures of grasses, forbs, leguminous forages.
  - Trees and browse plants into silvopasture.
  - Strategic supplementation.
  - Use of inexpensive byproduct or alternative supplemental feedstuffs.
  - Modified birthing time, careful selection of species, breed within species, and individual animals within breed for specific production conditions, etc.





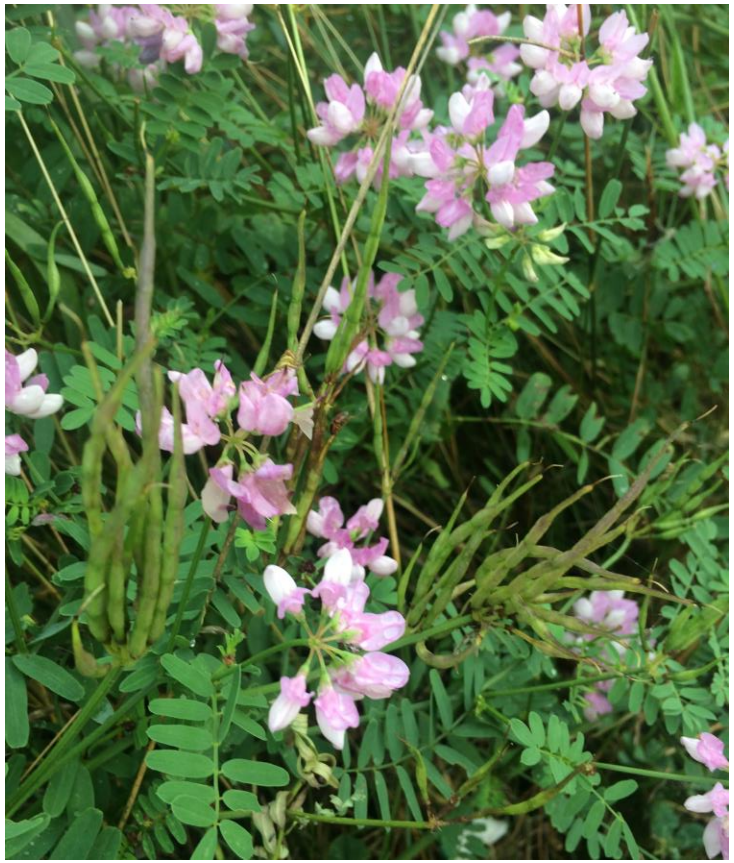
Brann, USDA/NRCS

Percent contribution of different vegetation types to the diet of grazing ruminants

Vegetation type/ruminant	Spring	Summer	Autumn	Winter
Woody species				
Goats	5	76	45	38
Sheep	3	18	15	4
Cattle	2	10	5	3
Shrubby species				
Goats	7	11	27	28
Sheep	2	11	10	4
Cattle	2	4	4	3
Grasses				
Goats	88	13	28	34
Sheep	95	71	75	92
Cattle	96	86	91	94

Fedele, 2001

Forage Selection for Your Farm



- A pasture can be comprised of many kinds of plants.
- Which species to plant depends upon the purpose of the pasture and the soil type.
- The best pastures usually contain a mixture of grasses and legumes.
  - Selecting one or more grass and legume species is usually preferable to commercial pasture mixes which may contain plant species which are not adapted.

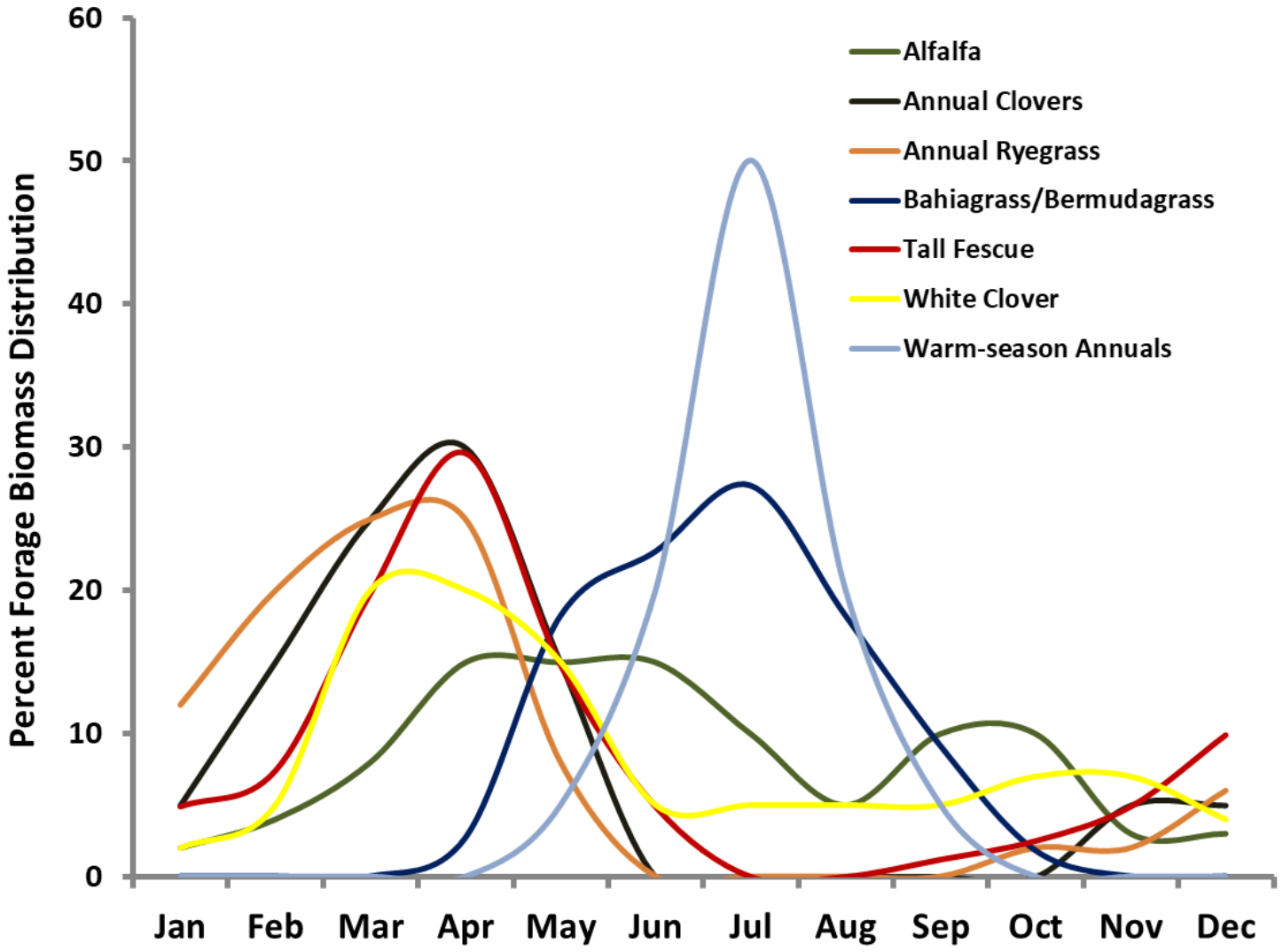
What is Forage?

- **Forage** is fibrous plant material.
  - Fresh (pasture), dried (hay), or fermented (haylage or silage).
- Forages provide both protein and energy at a lower cost, but they can vary in their nutritional quality.
  - Quality depends on the plant's maturity at the time of harvest, plant species, soil fertility, weather, available water, and storage method.

Types of Plants

- **Grass** – any one of several plant species that have leaves that are typically longer than they are wide, with parallel veins.
- **Forb** –broadleaf plants that are not grasses, sometimes divided to separate out ***legumes.***
- **Legume** – plants that produce pod type fruits and are characterized by fixing atmospheric N.
- **Browse** – the leaves and growing tips of forbs and woody shrubs.

Forage Production from Base Forage



Cool-season Annual Legumes

Cool-season Perennial Legumes

They can fix from 60 to 120 pounds of nitrogen per acre.


Forage Soybeans


Cowpeas


Sun Hemp

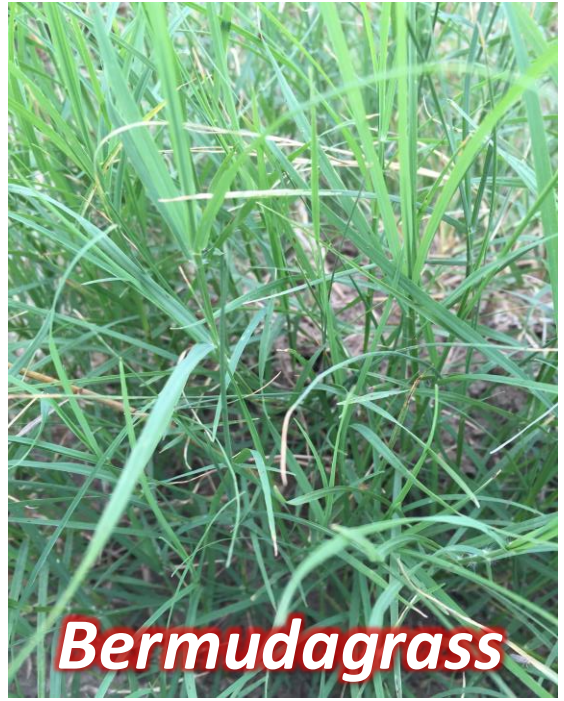

Sericea
Lespedeza


Annual
Lespedeza


Alyce clover


Partridge
Peas


Dallisgrass


Bermudagrass

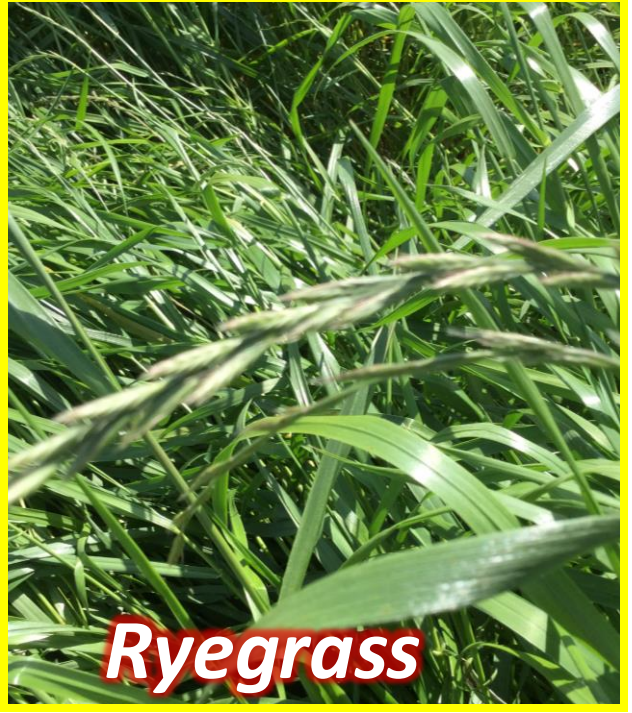

Bahiagrass


Crabgrass


Forage Sorghum


Pearl Millet


Sorghum-Sudan Hybrid



Cool-season Annual Grasses

- There are millions of acres planted annual ryegrass each year.
- Combination of small grains and annual ryegrass can extend the grazing season.

Forbs

Chicory

Brassica

Radish

- Chicory contains tannins that have been shown to help in reduction of parasite loads.
- Leafy Brassicas include rape and kale which provide forage from leaves and stems.
- Root Brassicas include turnips, radish, and rutabagas which provide forage from leaves, stems, and roots.
- Flowers of turnips have a high content of mustard oil which can be toxic to animals.
- Turnips may cause an off-flavor in milk.
- Immature rape can be high in nitrates.

Brush As A Base Forage

- Browse and grasses constitute 60-90 percent of the diet of goats.
  - As natural browsers, goats prefer to graze above the shoulder.
  - Being selective in nature, goats will choose brush, woody perennials and broad leaf plants.

- Goat grazing restores biodiversity and the consumption of small brush will reduce fine fuel load, reducing fire hazard.

Managing for Brushy Species

- Because animals are grazing away from the ground, they pick up very few infective parasite larvae, and some browse plants have antiparasitic qualities.
- The protein content of browse is high, but availability of protein may be affected by tannins in the browse.
- Energy levels are moderate and will not support a high level of goat production, but usually adequate for does with twins.
- Calcium is adequate, phosphorus deficient and trace minerals unknown, so it is best to keep a high phosphorus mineral available.

Browse Species Consumed by Goats

Common name	Scientific name
Blackberry	*Rubus oklahomus*
Smooth Sumac	*Rhus glabra*
Winged sumac	*Rhus capallinum*
Poison ivy	*Toxicondendron radicans*
Oak spp.	*Quercus spp.*
Hawshorne	*Crataegus viridis*
Greenbriar	*Smilax bona-nox*
Elm	*Ulmus Americana*
Winged elm	*Ulmus alata*
Honey locust	*Gleditisia tricanthos*
Black locust	*Robinia pseudoacacia*
Multiflora rose	*Rosa multiflora*
Dogwood	*Cornus drumumdii*
Privet	*Ligustrum spp.*
Mulberry	*Morus spp.*
Sweet gum	*Liquidambar styraciflua*
Poplar	*Populus spp.*
Eastern red cedar	*Juniperus virginiana*
Russian olive	*Elaegnus augustifolia*
Honey suckle	*Lonicera japonica*
Pine	*Pinus spp.*

Pasture Management and Parasite Control

- Managing the pasture for the avoidance of parasites is more important than managing pastures for maximal production.

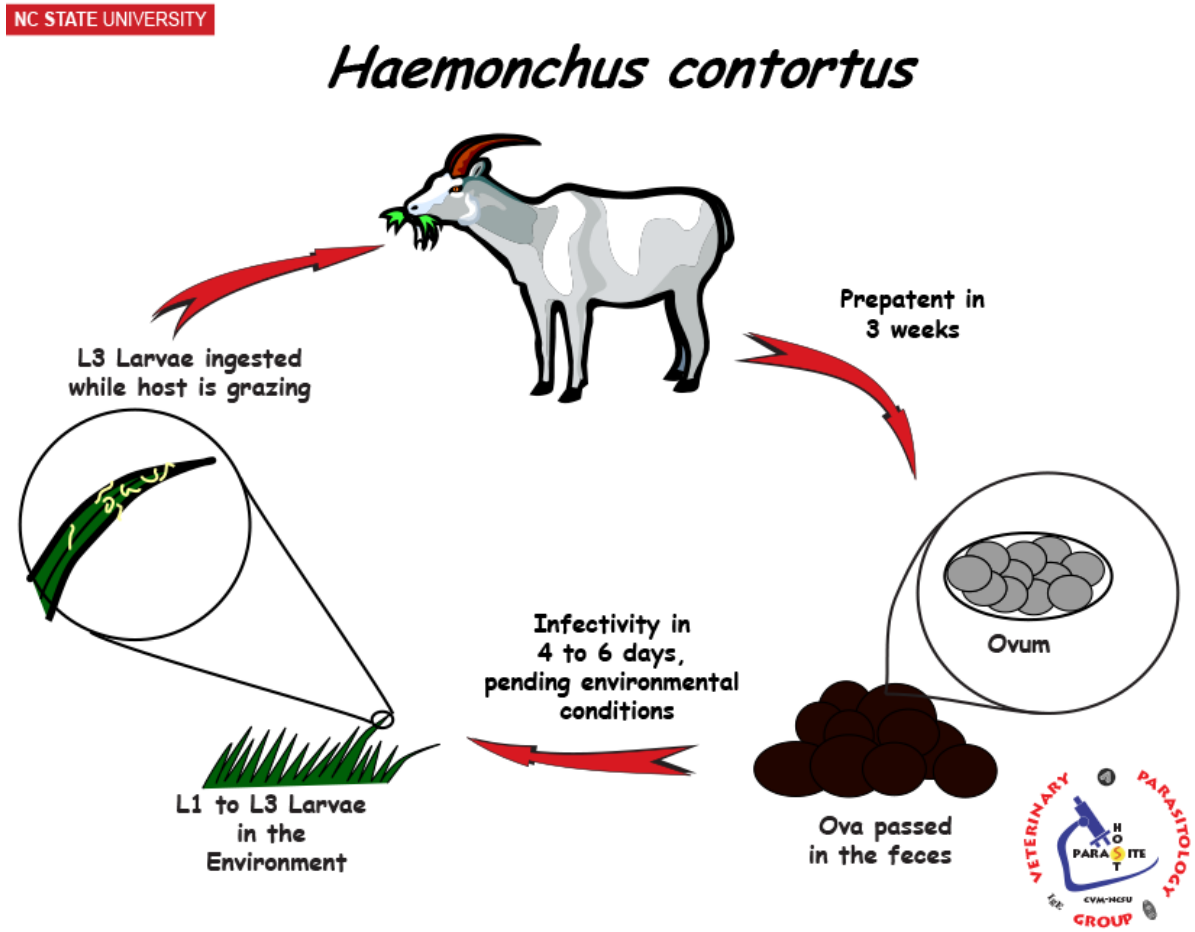
- Considerations
  - Strive to keep grazing height 5” or higher.

  - Graze a contaminated pasture with another livestock species.
    - The goat parasite larvae cannot survive in the gastrointestinal tract of another herbivore species such as cattle.
    - This does not apply to sheep, which share worms with goats.

  - Use control grazing practices to optimize pasture production.
    - This is a better practice than continuous grazing on the same pasture because goats will return to the same areas where their favorite plants are growing.
    - Those areas will then become heavily infected by gastrointestinal parasite larvae.

Parasite Load and Pastures

- One of the major components of an effective parasite control program is reducing the number of parasites to which goats are exposed.
  - One way to accomplish this is to manage pastures in a way that will reduce parasite load.
- Take a hay crop from the pasture area. This can be incorporated into a dose-and-move program in which goats are grazed on one pasture in the early grazing season and then moved to another goat pasture that was used for a first-cutting of hay
- Incorporate annual pastures into the grazing system .



Grazing Management for Small Ruminants

- Grazing management is how forage is utilized.
- The goal for grazing system management is to provide as much of the nutrients required by the animal from economical forage sources.
- This implies that nutrients from forages under some conditions may not be the cheapest, depending on the forage system.
- Well managed pastures can be one of the cheapest sources of nutrients.
- The time goats spend grazing depends on:
  - Number of hours on pasture
  - Forage availability
  - Pasture botanical and nutritional composition
  - Feed supplementation.

Continuous Grazing Management

- Continuous grazing is the simplest where animals are confined to one area during the grazing system and has the lowest harvest efficiency (percent of forage grown that is consumed).

- It has deleterious effects to forage in that species that are most preferred are most heavily defoliated, reducing their persistence.

- Forages closer to a water source, mineral source or barn are defoliated more extensively.

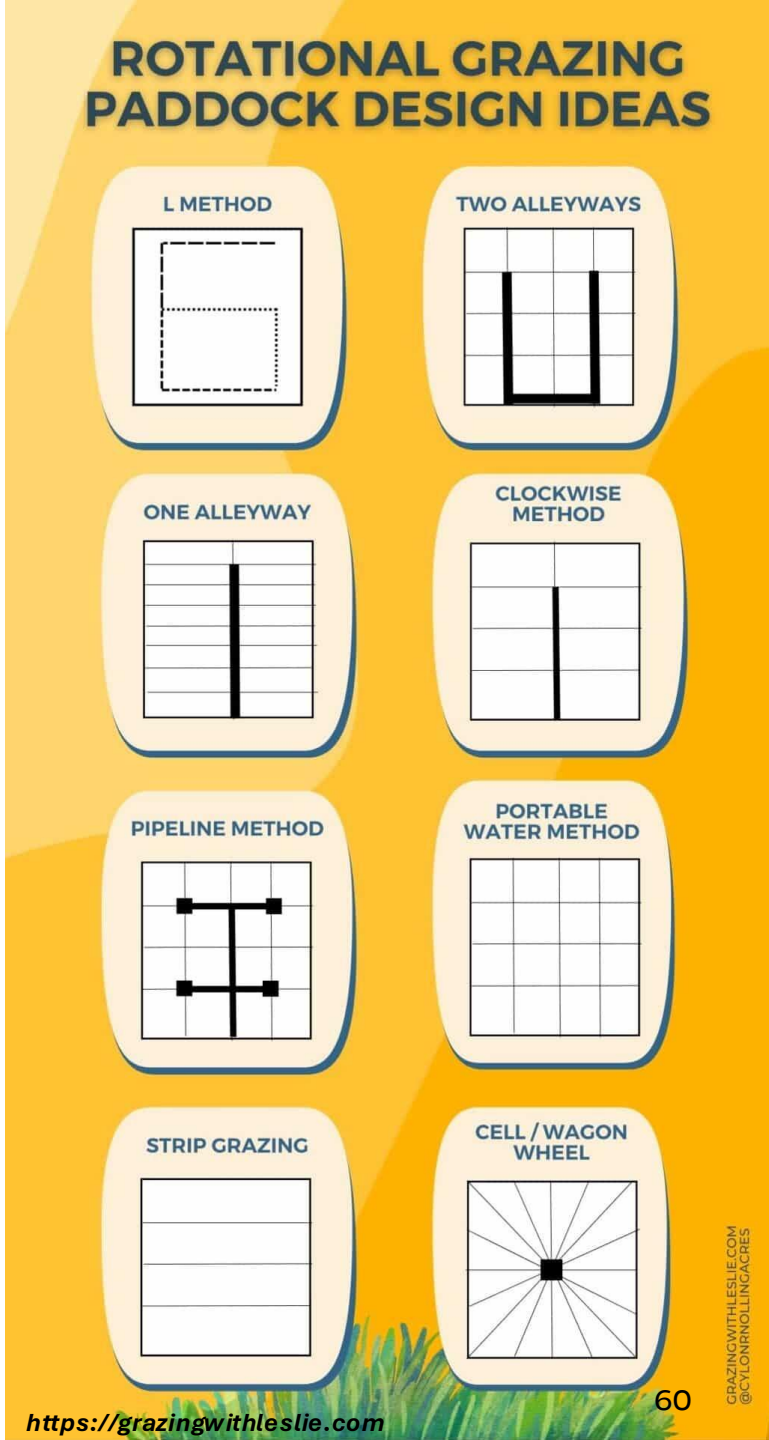
- Continuous grazing is the least preferred grazing system for goats since it promotes internal parasites which are a great problem in goats.
    - However, continuous grazing is the system of choice for controlling brush and weeds since the goal is to overgraze brush and weeds to reduce their persistence and thereby control them.

Rotational Grazing Management

- Rotational grazing is a system where pasture is divided into multiple paddocks and each paddock is grazed for a period of time while the other paddocks are rested.

- Advantages:
  - Greater forage production (20%) in that plants are able to recover from defoliation.
  - Greater harvest efficiency due to less trampling.
  - More uniform grazing in that animals are “forced” to consume less desirable plants before they are moved to the next pasture.
  - Rotational grazing has the potential to increase harvest efficiency from the 40-50% observed with continuous grazing to 60-70% with rotation grazing due to reduced trampling losses.

- Disadvantages:
  - Extra cost of fencing and water points.
  - Increased labor and level of management required.
  - Often forage quality is slightly reduced, seldom a significant factor.
  - If the rest period is long enough, infective larvae numbers are reduced.



Prescribed Burning

Decreases residue for winter parasite survival.

Burning a pasture will **require having enough dead growth as fuel to support a fire.**

Summary

- Managing the forage system to provide as much of the nutrients required for animal production from pasture can greatly reduce production expenses, increasing enterprise profitability.

- A well-managed rotational grazing system can improve forage harvest efficiency, reduce consumption of internal parasite larvae and improve animal tameness.

- Good pasture management requires gathering information, planning and compromising to attain forage production objectives and the flexibility to cope with changes in the weather.

Final Message

- There is no "silver bullet" species for a grazing system.
    - No single species will be adapted to the entire farm, nor will it provide satisfactory production throughout the year.

- Choose forage species that are adapted to your climate, soil conditions, can resist grazing pressure and long-term persistence.

- Use controlled or rotational grazing practices that fit your needs to optimize pasture utilization and decrease issues with parasite loads.

Contact Information

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ANIMAL MOLECULAR AND CELLULAR BIOLOGY

UF IFAS UNIVERSITY of FLORIDA

SMALL RUMINANT PROGRAM

Can choline feeding during the breeding period improve pregnancy success of ewes and growth of the resultant lambs?

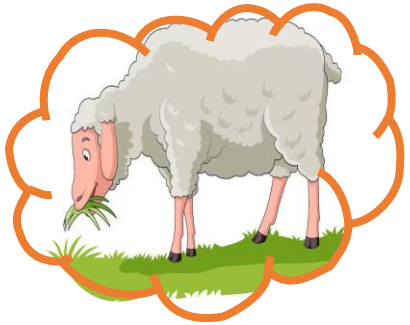
Masroor Sagheer, Quinn Hoorn, Daniel Carbalho, Brittany Diehl, and Peter Hansen

Department of Animal Sciences

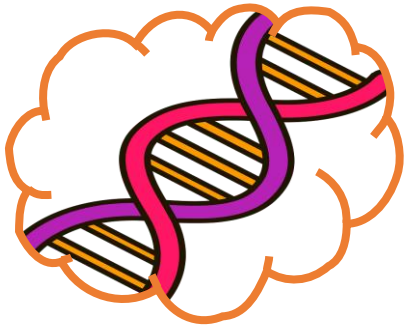
University of Florida

Small Ruminant Short Course
September 20-21, 2024
Gainesville, Florida

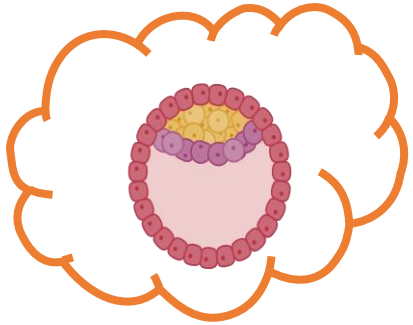
Approaches to enhance animal performance



Improved environment
-i.e., management



Improved genetics

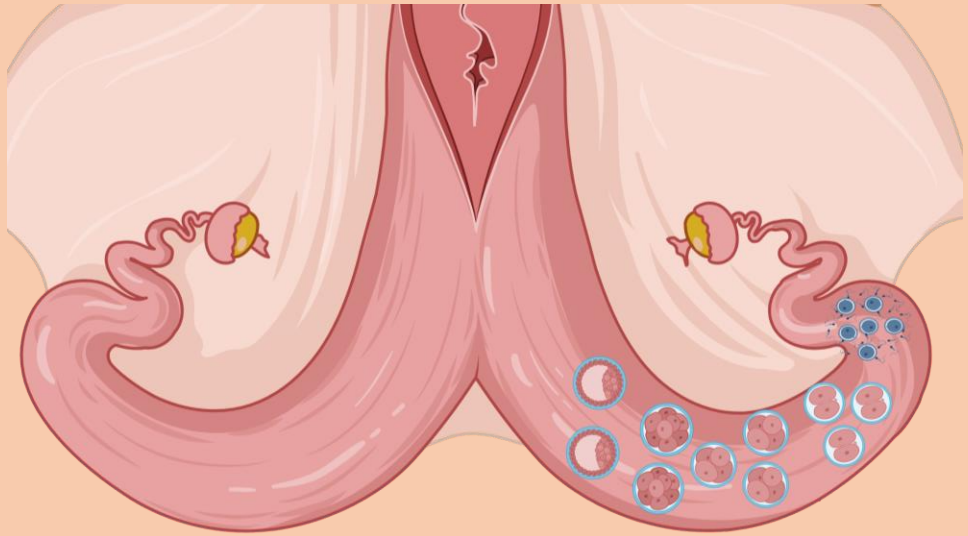


Developmental programming

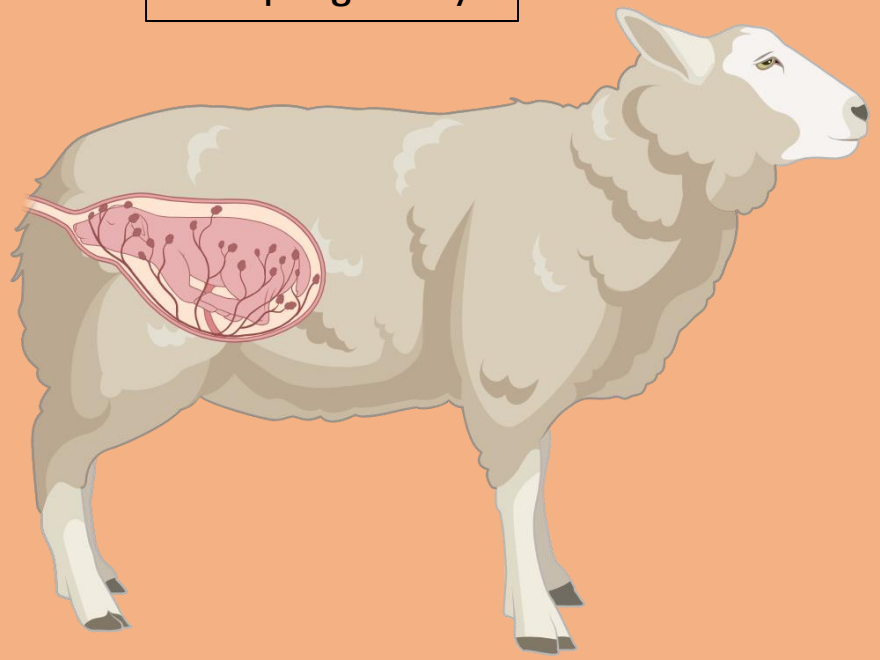
Developmental programming

Undernutrition | Cobalt and sulfur-deficient diet | Heat stress | Shearing | Cortisol | Over/undernutrition

Early pregnancy



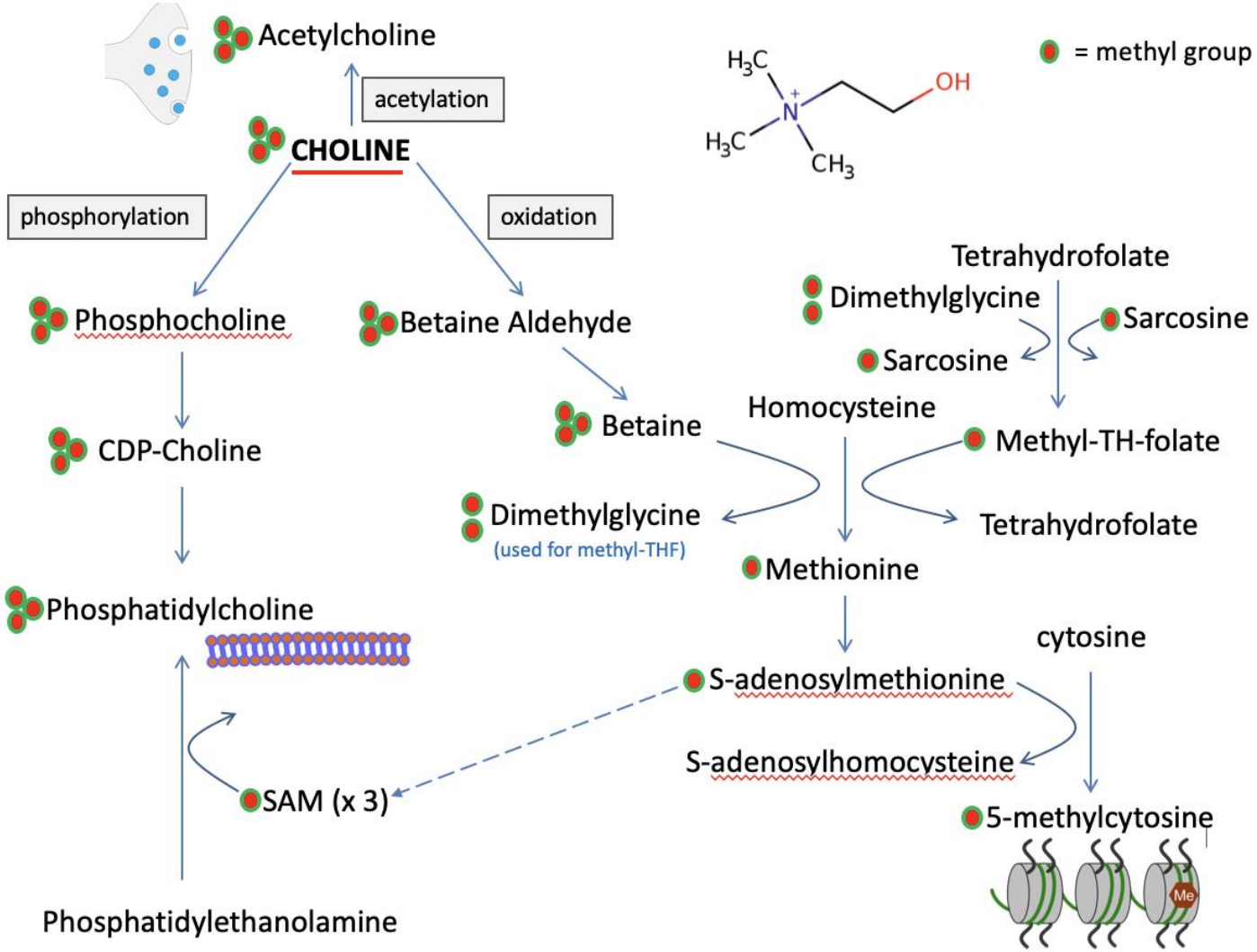
Late pregnancy



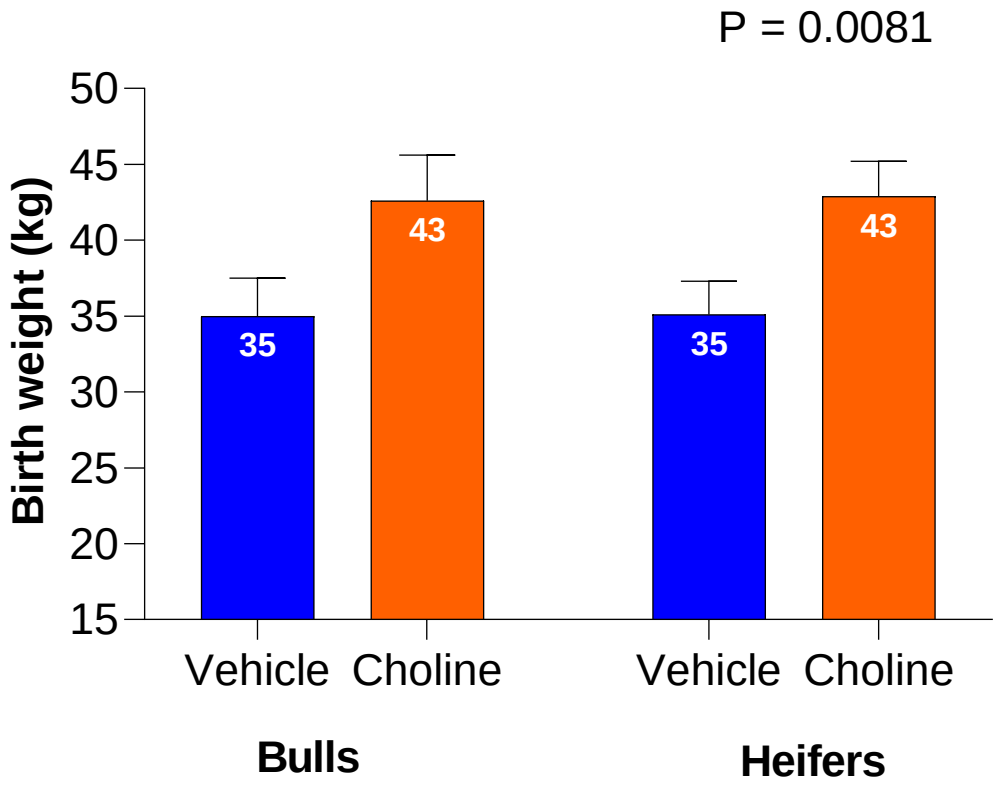
Effects on lambs

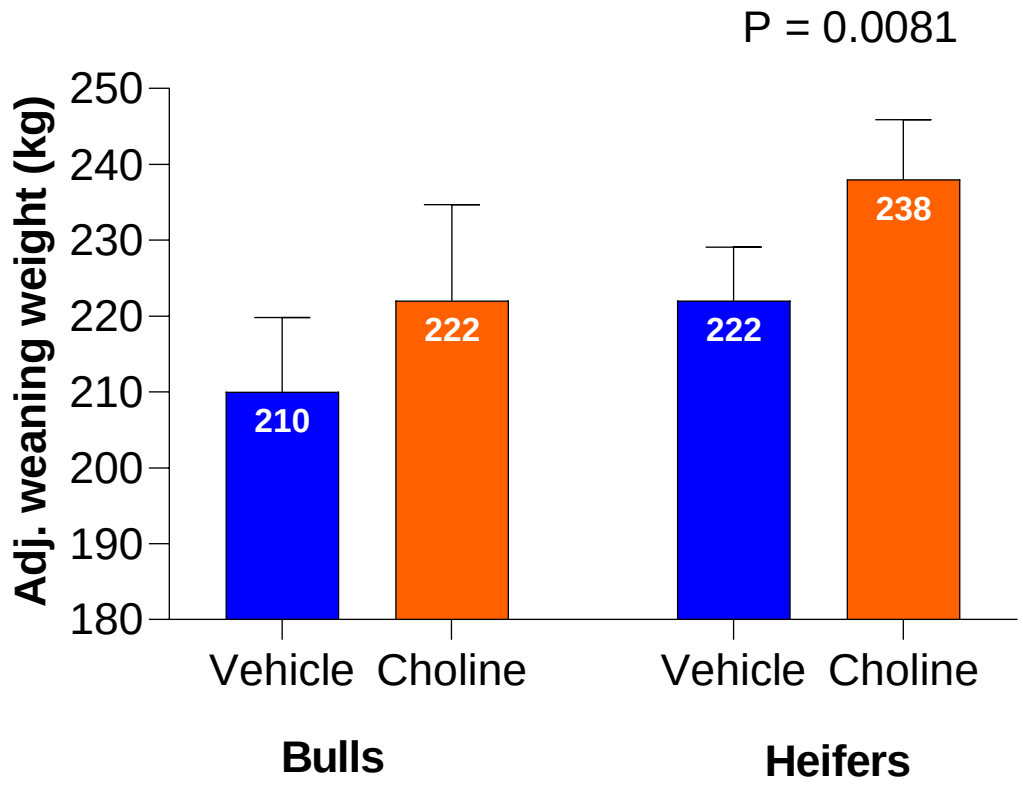
Birth weight, growth rate, organ development/function, and hormone concentrations

Choline – an essential nutrient that can program development



Choline chloride treatment increased birth weight and weaning weight of calves





Estrada-Cortés E, Ortiz W, Rabaglino MB, Block J, Rae O, Jannaman EA, Xiao Y, Hansen PJ. Choline acts during preimplantation development of the bovine embryo to program postnatal growth and alter muscle DNA methylation. FASEB J. 2021;35:e21926.

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Study Question

Can choline feeding during the breeding period program development to change postnatal phenotype of the lambs?

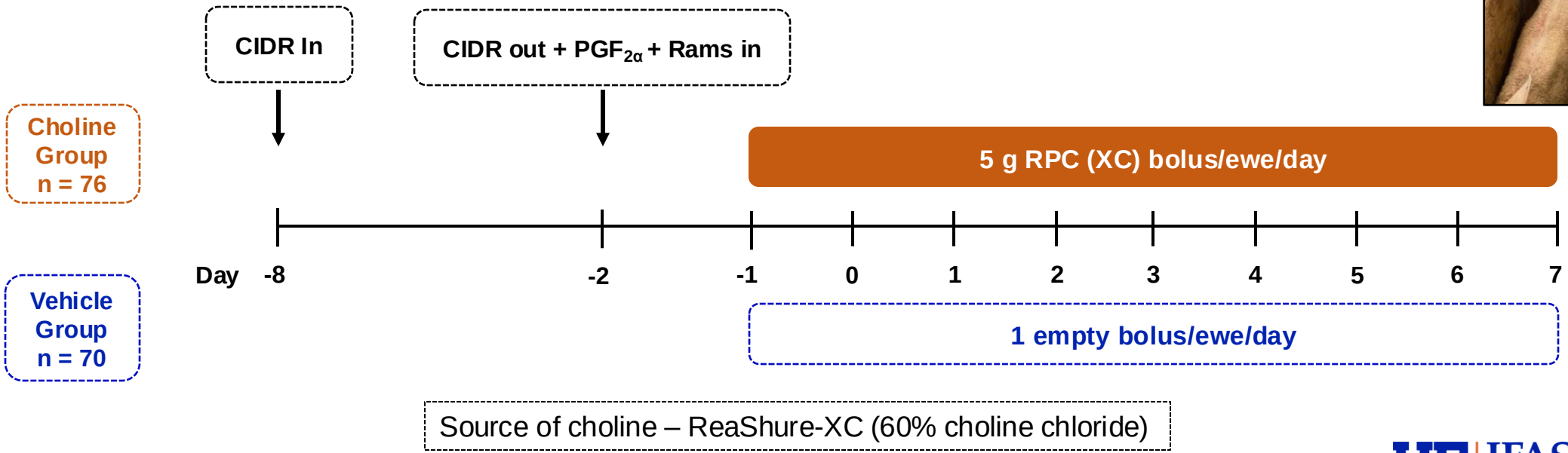
Hypothesis

Feeding 5 grams/day of rumen-protected choline (RPC) during the breeding period will improve the postnatal phenotype in lambs

Effect of feeding RPC

on pregnancy rate, pregnancy loss, and postnatal phenotype

- ✓ Adult multiparous ewes (n = 146)
- ✓ SPU Gainesville
- ✓ Blocked by breed and age
  - ✓ Katahdin, Fl Nat, Texel, cross
- ✓ Synchronized for natural breeding with rams
- ✓ Individual bolus feeding (5 g of 60% choline chloride in a gelatin capsule *vs* empty gelatin capsule)



Source of choline – ReaShure-XC (60% choline chloride)

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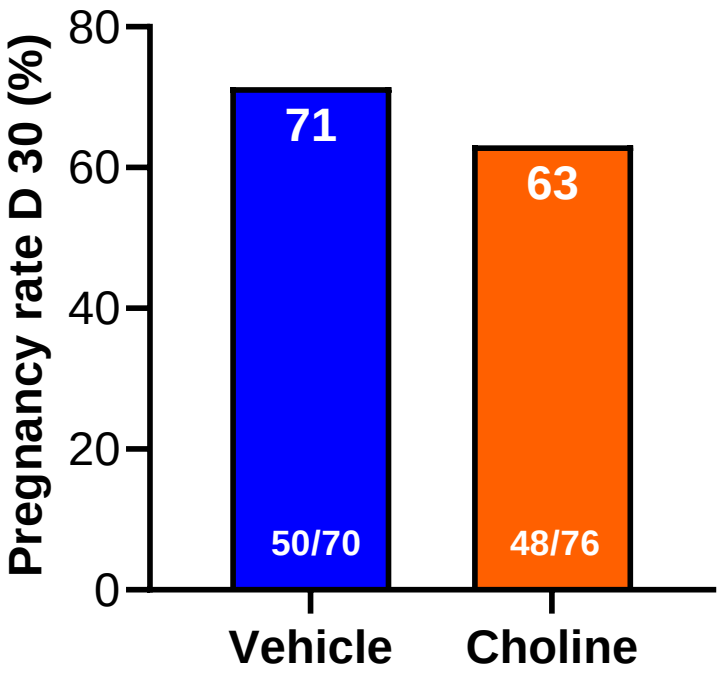
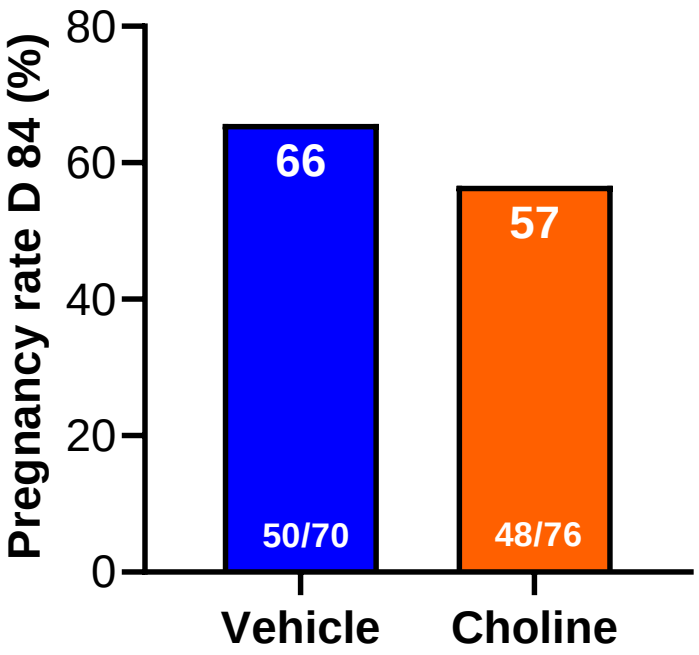
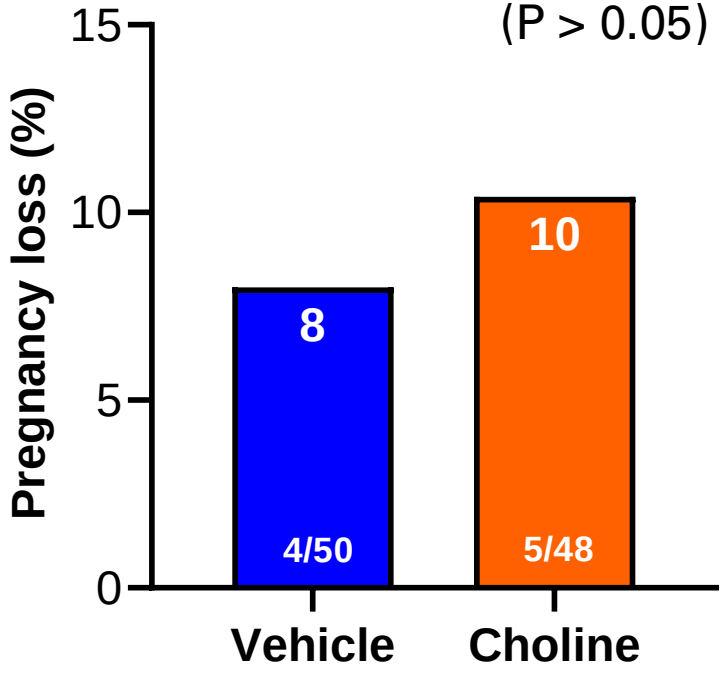
Endpoints

- Pregnancy rate – Days 30 & 84
- Pregnancy-associated glycoproteins – Days 30 & 84
- Birthweight
- Litter size and sex ratio
- Weaning weight
- *Longissimus thoracis* (ribeye) muscle area
- Fat thickness

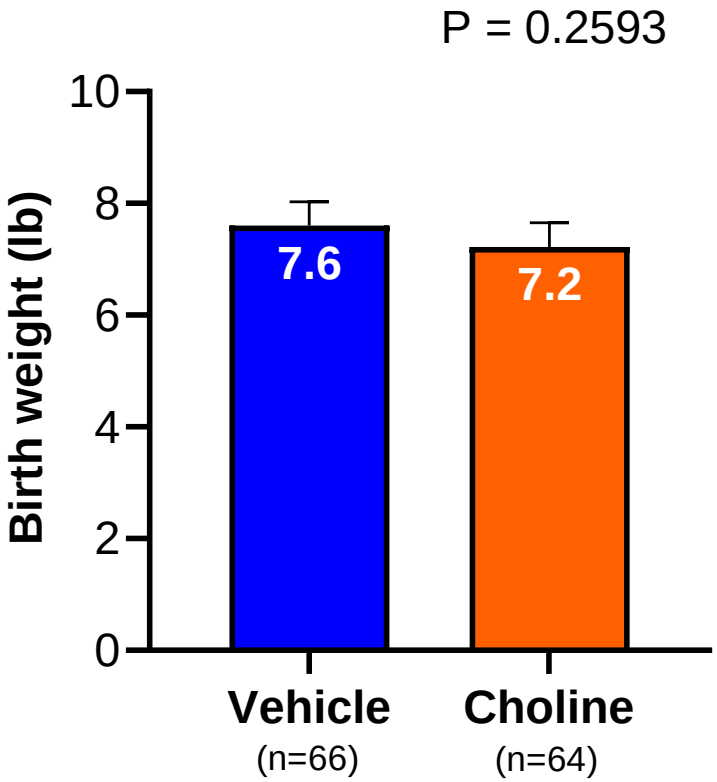
Results – RPC feeding did not affect pregnancy rate and pregnancy loss

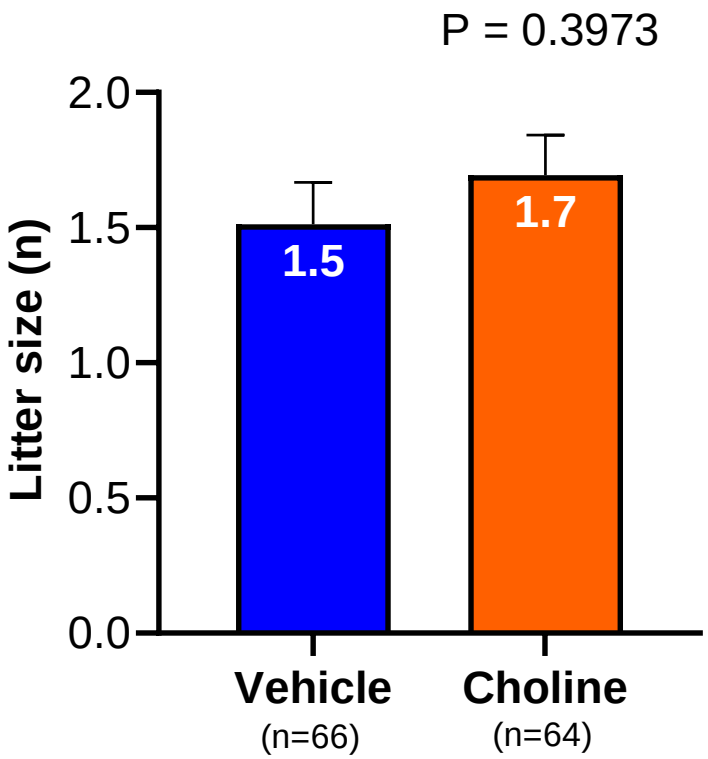




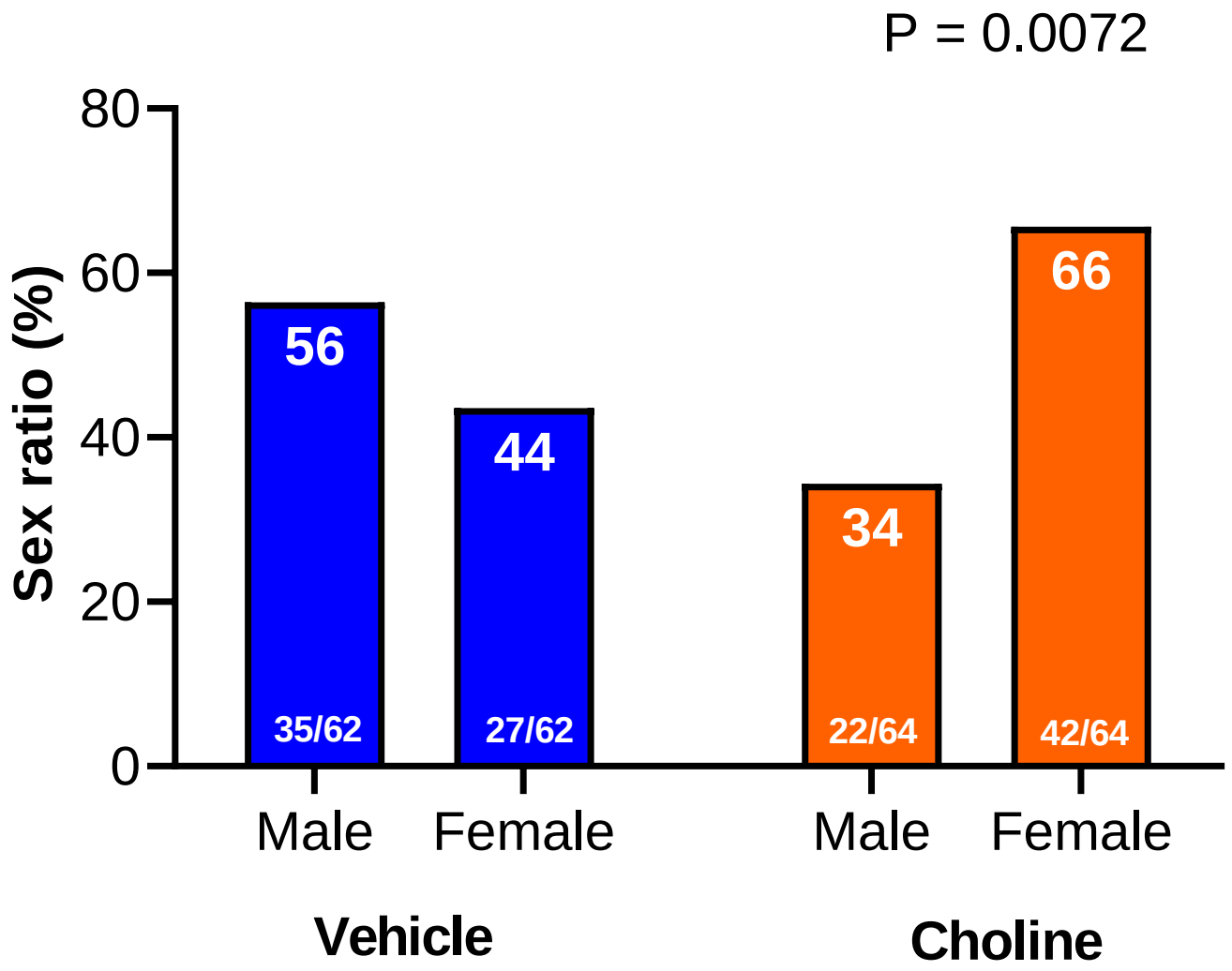


Results – RPC feeding did not affect birth weight and litter size

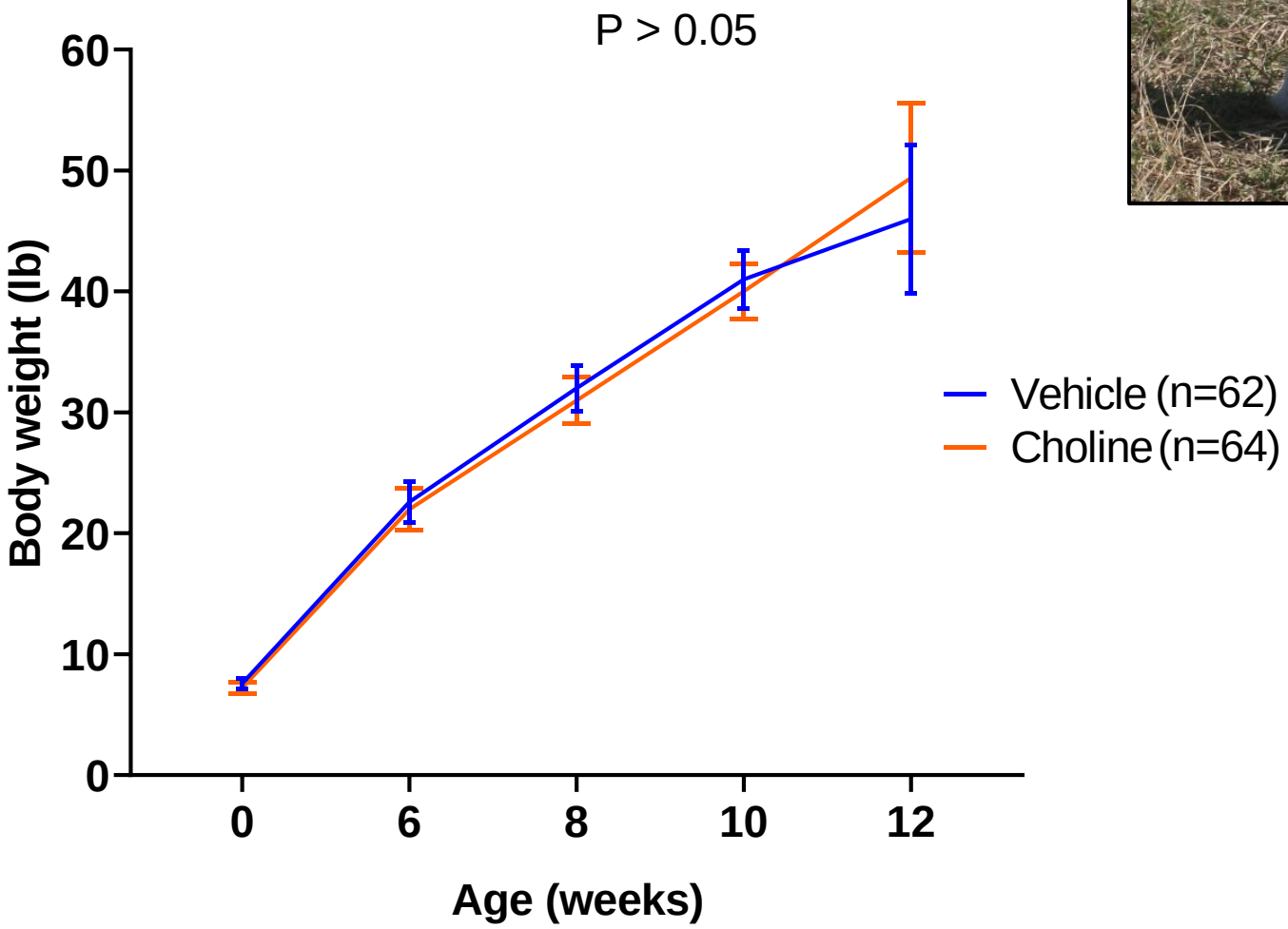




Results – RPC feeding altered the sex ratio in lambs



Results – RPC feeding did not affect body weight from birth until weaning



Conclusions

- ✓ RPC feeding during the breeding period did not affect pregnancy rate, pregnancy loss, birth weight, litter size, and body weight from birth until weaning
- ✓ RPC feeding altered the sex ratio at birth

Future plans

- ✓ Repeat the findings with another location and breed (Dorper)
- ✓ Maternal placental function
- ✓ Carcass ultrasound

Acknowledgements

Hansen Lab
Quinn Hoorn
Camila Cuellar
Tatiane Maia
Danial Stanton
Mariangela Maldonado
Serdal Dikmen

UF Sheep Unit
Dr Brittany Diehl, UF
Clay Whitehead
Jack Arthur

Funding sources
USDA-NIFA AFRI grant
HEC Pakistan

USDA-NIFA AFRI
2023-67015-40730

Higher Education
Commission Pakistan

The interplay between host genetics, microbiota and immune response for enhanced health in sheep

Fernanda Rezende, PhD

Assistant Professor
Statistical Genetics and Quantitative Genomics

Gastrointestinal parasites in small ruminants

- **Producing and raising healthy animals** is integral to the **profitability and success of sheep operations**

- Gastrointestinal parasites are a **major health problem** in flocks worldwide

- **Economic losses** due to parasitism are two-fold
  - Direct cost of **anthelmintic treatment**
  - **Production losses** due to ill-thrift and in extreme cases death

- **Drug-based parasite control strategies**
  - Increased anthelmintic resistance
  - Need to minimize residual in animal products and the environment

Breeding for host resistance

- **Breeding for host resistance** has been shown to be a **viable method of nematode control**
  - *Resistance* refers to the ability of the host to resist infection
  - *Tolerance* indicates the host is infected by the pathogen, but suffers little adverse effect
  - **Goal**: avoid the spread of the disease, resistance rather than tolerance is required

- **Selection of resistant individuals**
  - **Egg worm count** in fecal samples has been used as a as proxy for parasite resistance
  - Extensive between-animal variation
  - Moderate heritability: **0.2-0.3**

- Additional indicator traits
  - **Resilience**: growth rate and required treatment frequency
  - **Impact of infection**: anemia level (e.g., FAMACHA score)
  - **Immune response**: antibody levels such as IgA, IgG and IgM

Immune response and the resistance to parasite

- The **ability to resist gastrointestinal infection** is dependent on the **development of a protective acquired immune response**

- **Adaptative immune system** can **learn and remember** specific pathogens, providing **long-lasting defense and protection** after initial exposure to specific pathogens

- Both **Humoral and Cellular immune responses** are elicited by helminth parasites
  - ***Humoral*** response centers on the production of antibodies by lymphocytes called **B cells**
  - ***Cellular*** response is mediated by specialized lymphocytes called **T cells**

- **Gastro-intestinal resistant vs susceptible animals**
  - Increased IgA, IgG1 and IgE antibody production
  - Faster immune response than susceptible individuals

McRae et al. (2015)

UF Sheep Project Goal

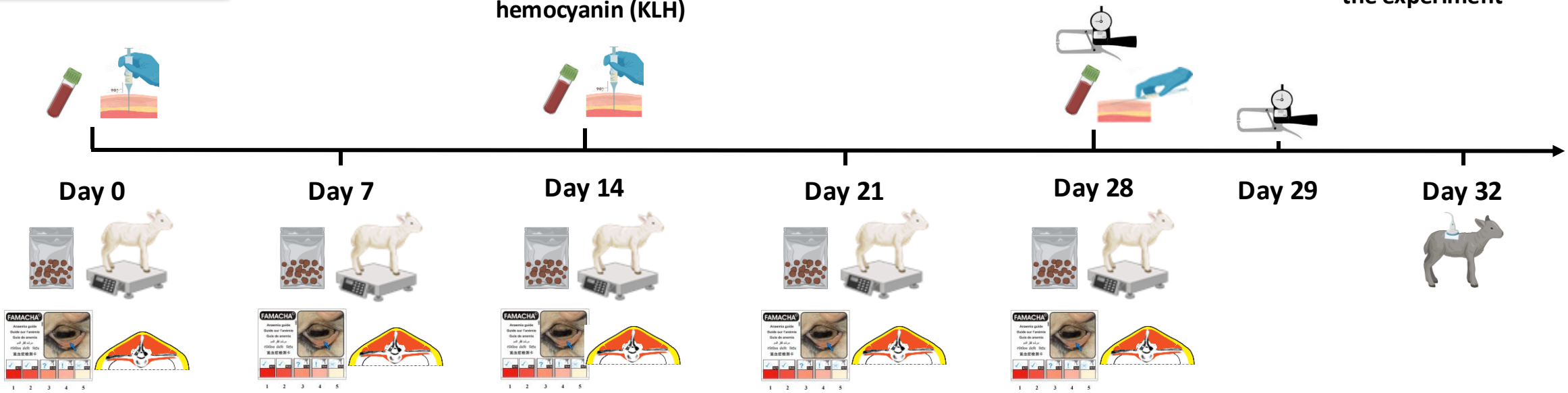
To understand the **genetic basis of immune responses** to foreign antigen and the **interplay between genetics, immune response and gut microbiota** composition to **enhance parasite resistance**

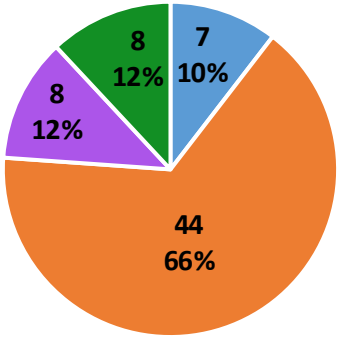
Experiment summer 2024

67 lambs:
44 females
23 males

Foreign antigen: keyhole limpet hemocyanin (KLH)

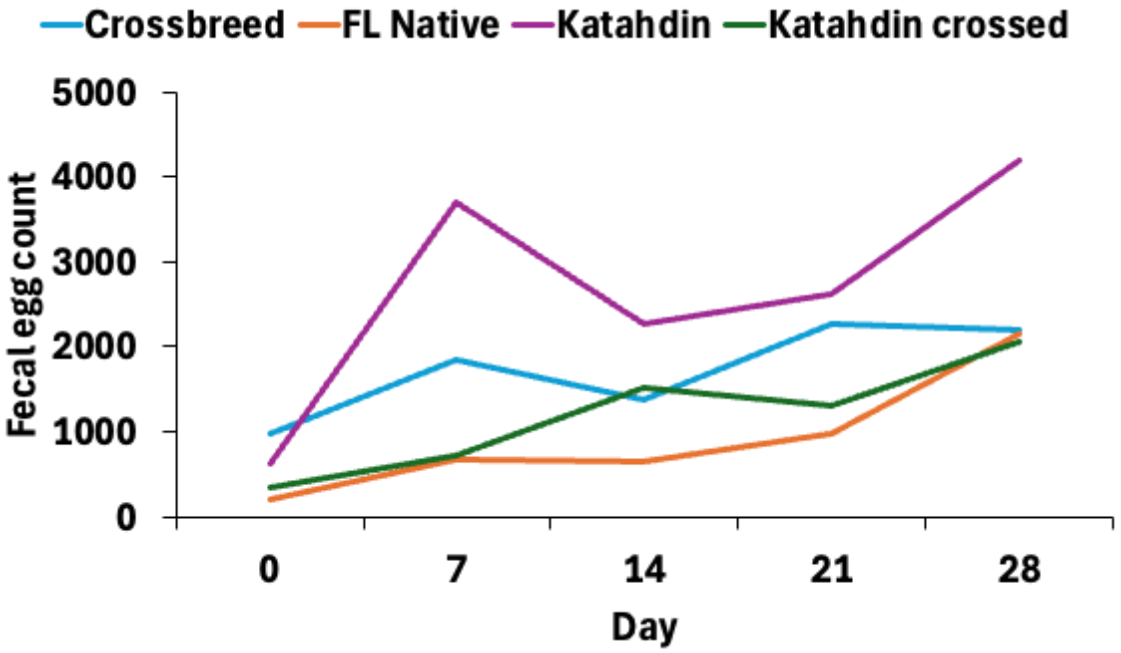
Natural parasite infestation
No deworming during the experiment

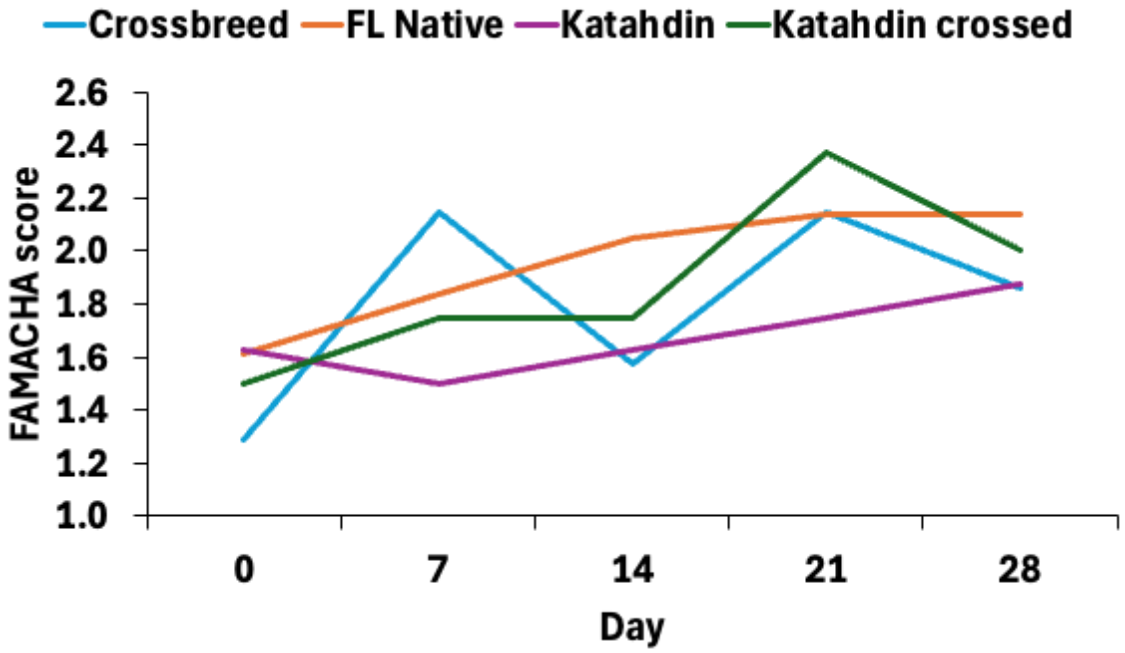




	Mean	Min	Max	CV(%)
Age	135	119	145	5.4
Weight	61.13	37.00	95.00	21.25
BCS	2.79	2.25	3.5	9.46

Parasite infestation and anemia indicator

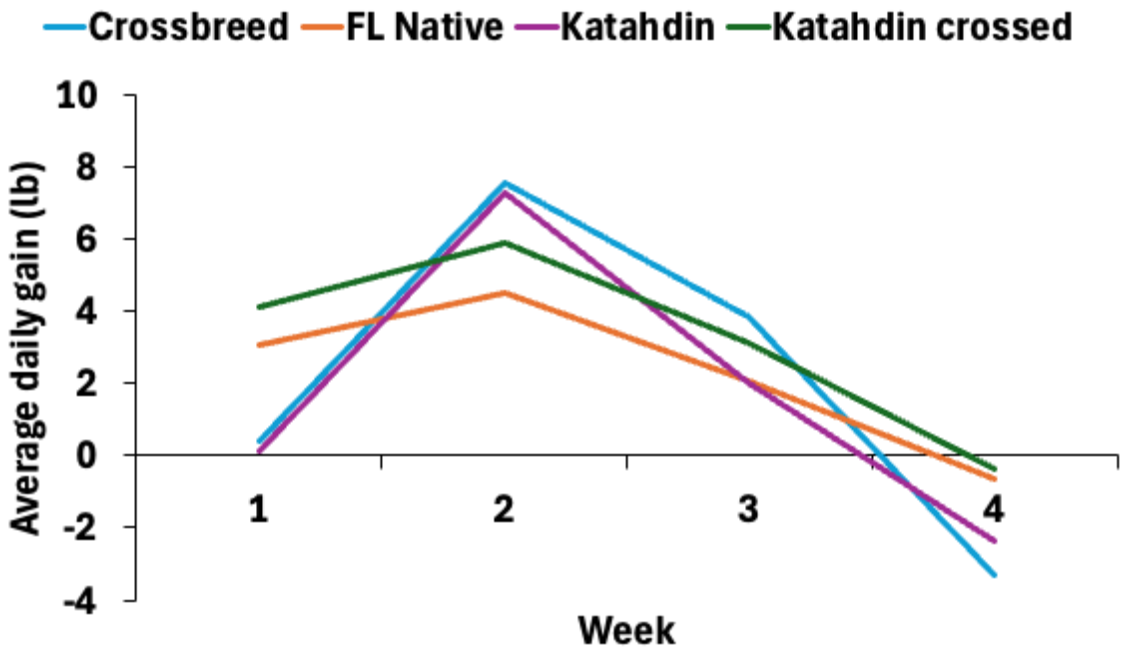


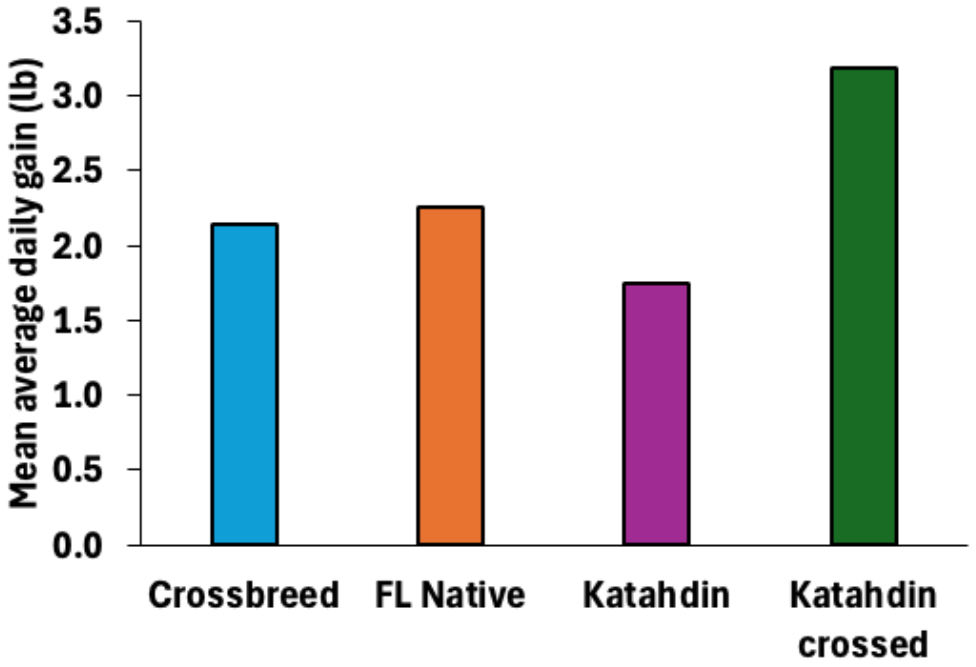


- Increased FEC → **animals were challenged**
- Katahdin consistently highest FEC (susceptibility)
- FL Native consistently lowest FEC (resistance)

- Increased FAMACHA score → **infestation impact**
- FL Native almost linear increase in FAMACHA score
- Katahdin consistently lower score (resilience)

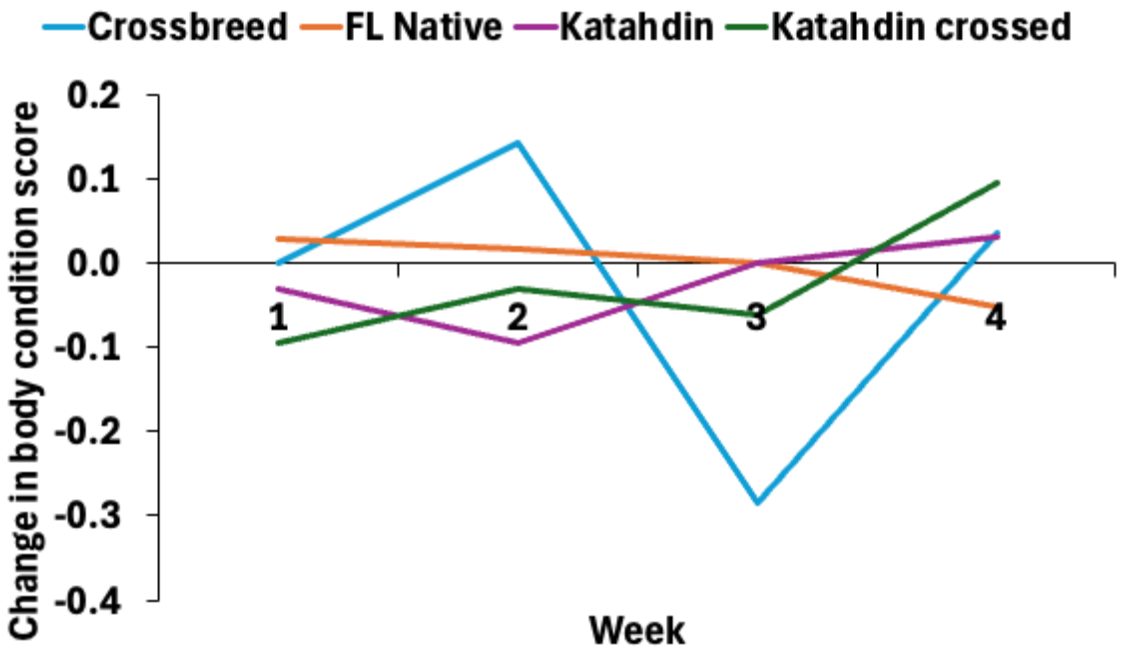
Change in average daily gain

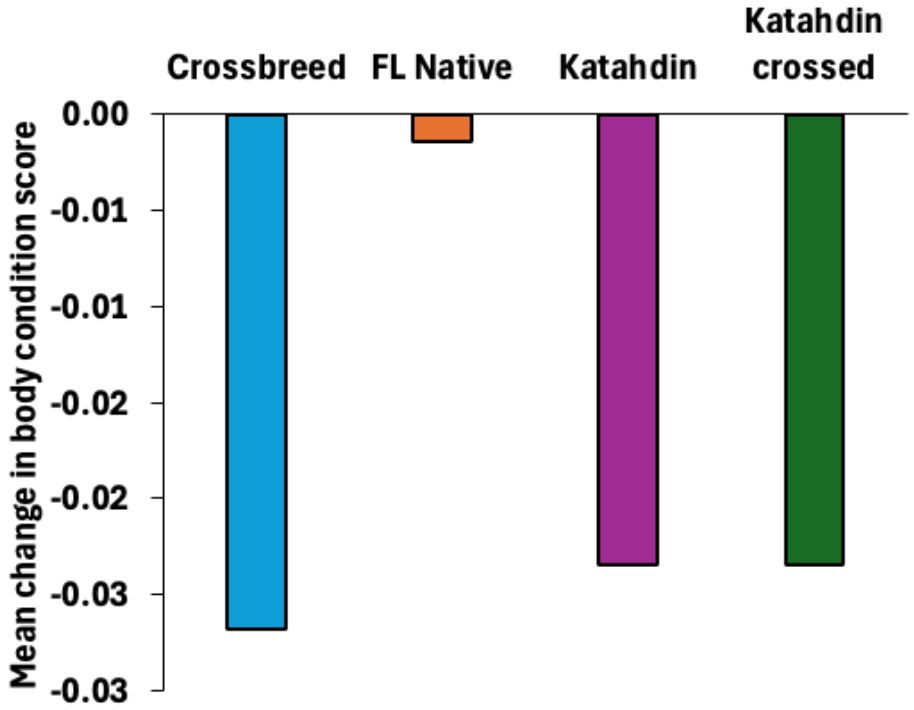




- Weight loss → **impact of parasite load on growth rate**
- FL Native & Katahdin crossed showed lowest weight loss at the last week (resilience?)
- Pure Katahdin showed lower mean average daily gain during the experiment

Change in body condition score

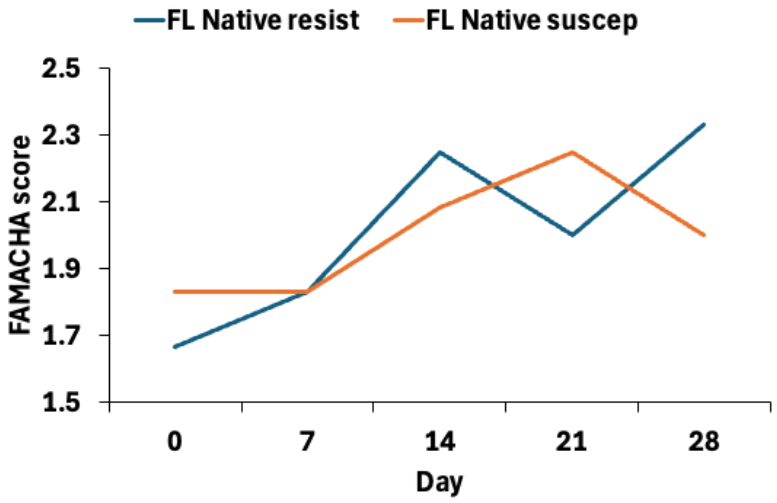


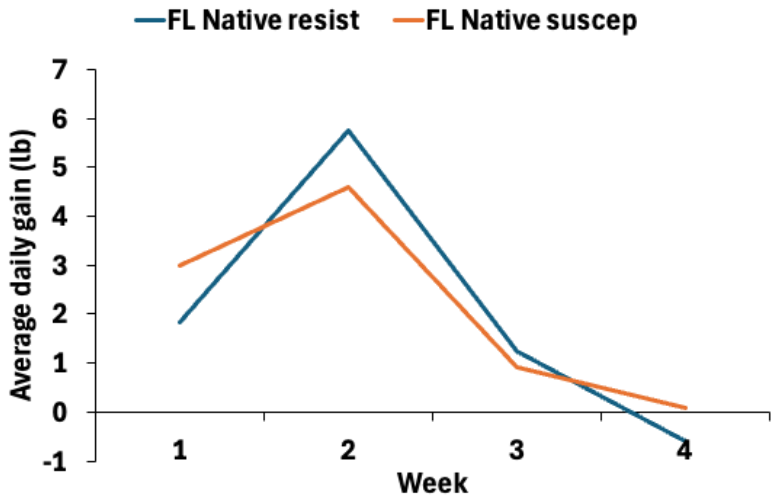


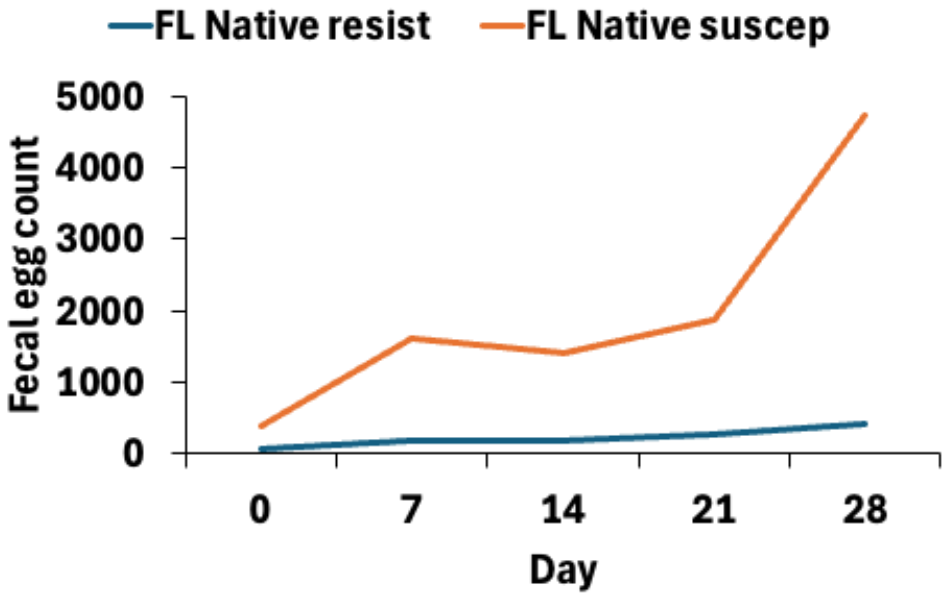
- **No drastic change in body condition score** during the experiment
- Crossbreed reduced BCS in week 3 but recovered later
- Katahdin & Katahdin crossed slightly increase in BCS compared to initial values
- FL Native lowest change in mean body condition score during the experiment

Resistant versus Susceptible Florida Native lambs

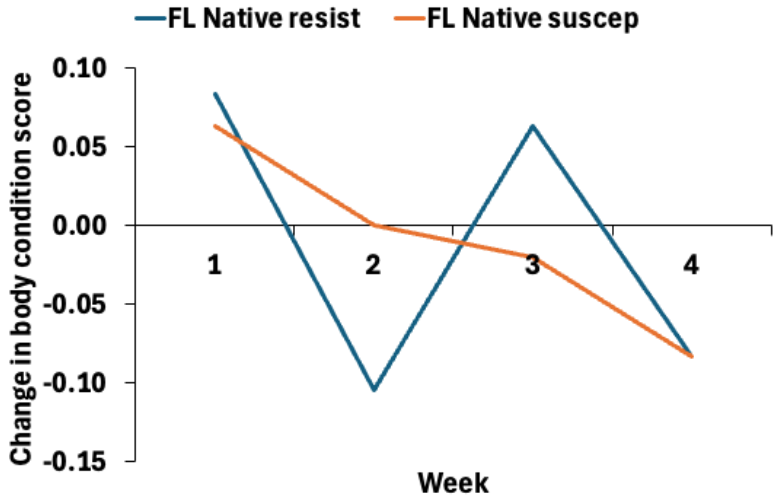
12 resistant
12 susceptible





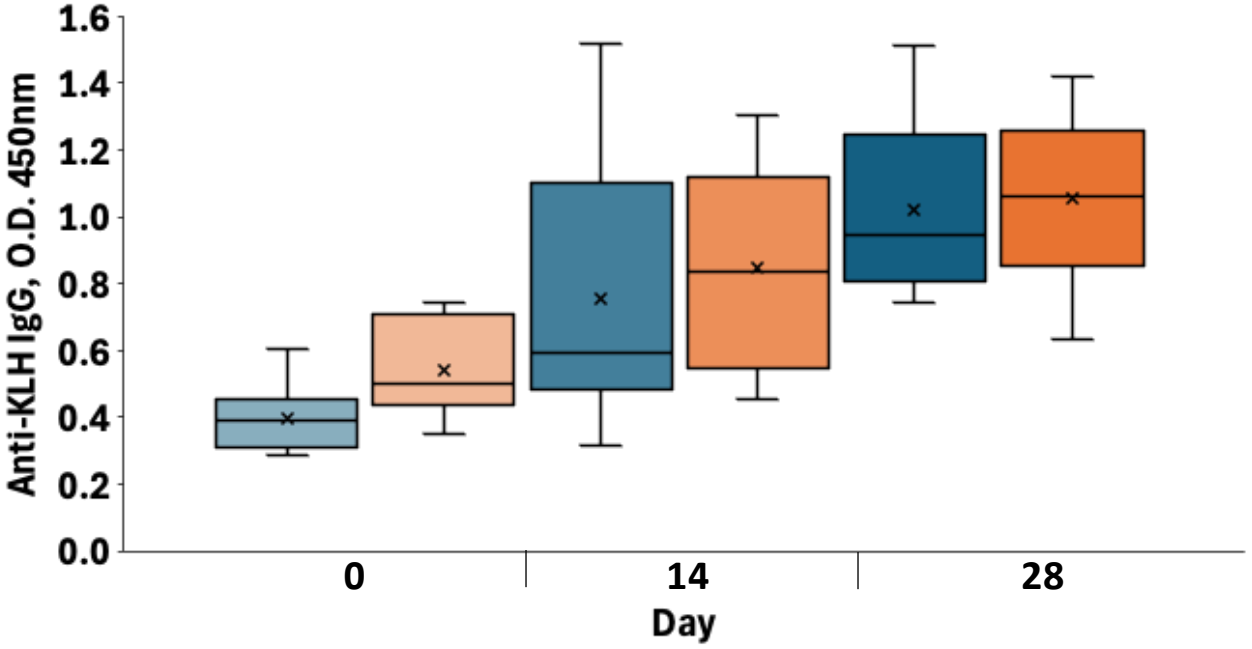


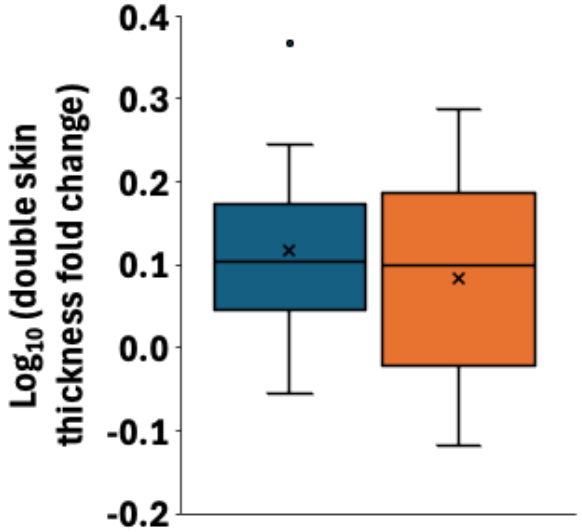
- Considerable **difference in fecal egg count** between groups
- **Similar performance** (FAMACHA, ADG, BCS)
- Resilient instead of susceptible?

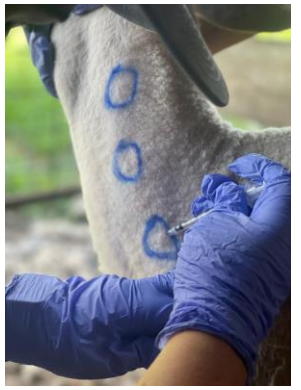


FL Native resistant
FL Native susceptible

Antibody and cellular immune response







- Increased level of anti-KLH antibody (IgG) → **humoral response**
- Change in skin fold thickness → **cellular response**
- Variability in immune response → genetic variability
- No difference immune response between resistant and susceptible animals

Acknowledgements

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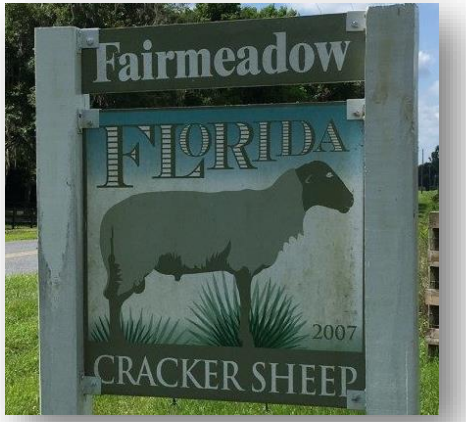
SMALL RUMINANT PROGRAM

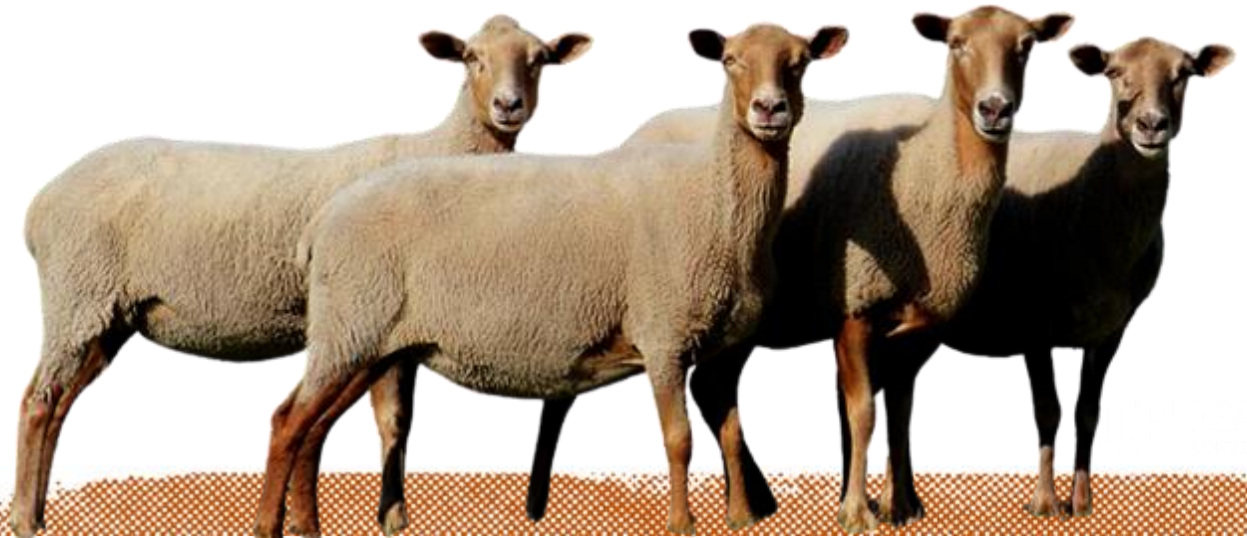


Mrs. Carol Postley

UF UNIVERSITY of FLORIDA
Department of Animal Sciences

Rezende Lab
Animal Statistical Genetics &
Quantitative Genomics

Thank you for your attention!



Fernanda Rezende

Phone: +1 (352) 294-6988

Email: frezende@ufl.edu

Lamb Merchandising

Kyle Mendes
University of Florida

How do you plan to sell it?

- On-farm slaughter by purchaser on farmer's land
  - Up to the producer- probably send them with offal
- If you plan to sell meat piece-by-piece
  - The animal must be initially slaughtered under USDA FSIS inspection
- If you pre-sell the meat from animals prior to slaughter
  - This can be facilitated without USDA FSIS inspection (Custom Exemption)

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AN316

https://edis.ifas.ufl.edu/pdf/AN/AN316/AN316-Dkyis7bjm2.pdf

How Do I Legally Sell Meat from My Own Livestock and Poultry in Florida?[1]

Chad Carr, Jason Scheffler, Larry Eubanks, Elena Toro, Ron Webb, Lee Cornman, Scotland Talley, and Steve Stiegler[2]

There is much interest in locally produced foods, but the federal, state, and local regulations can be confusing. The purpose of this document is to be a "one-stop-shop" for Florida residents who want to sell meat and poultry from their own livestock and poultry.

What species are eligible to be sold?

If you raise cattle, hogs, sheep, goats, or equine, these species are defined by the US Department of Agriculture's Food Safety Inspection Service (USDA-FSIS) as being "amenable livestock species," meaning that the US government is accountable for the products from those species (21 U.S.C. § 601–695; http://www.fsis.usda.gov/wps/wcm/connect/fsis-content/internet/main/topics/rulemaking/federal-meat-inspection-act/federal-meat-inspection-act).

Slaughtered under USDA-FSIS Inspection

- Find a facility http://edis.ifas.ufl.edu/pdffiles/AN/AN20300.pdf
- Get a label- simple @ first

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Sell my meat only at a farmers' market. How can I do that?

- Product must be slaughtered and prepared into retail ready pieces all under federal inspection.
- In order to sell packaged meat products at farmer's markets, a mobile food permit will be required Mobile Permit
- You will likely store the meat at a commissary which needs a letter of agreement Letter of Agreement

How do I sell this inspected product from our farm?

1. at least one employee who has been trained as a food manager
2. to meet minimum construction and sanitation standards
3. to meet water and waste management standards
4. a proper food permit, which will depend upon the kind of retail establishment the business would be defined as

And if you want to also sell at a farmers' market-

- a mobile food permit will be required Mobile Permit

USDA Custom Exempt Slaughter

- Only for the personal use of the owner of the animal
- The resulting product must be marked “Not for Sale.”
- Annual evaluation by USDA-FSIS

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AN248

Custom Exempt Red Meat and/or Poultry Slaughter Facilities in Florida[1]

Chad Carr and Larry Eubanks[2]

http://edis.ifas.ufl.edu/pdffiles/AN/AN24800.pdf

Several livestock and small poultry producers are trying to gain a greater portion of the available profit margin by becoming meat marketers, rather than just livestock producers. Custom exempt slaughter facilities can help facilitate the needs of niche meat marketers. Additionally, many Florida consumers aspire to buy locally raised products. A custom exempt facility is exempted from inspection by the US Department of Agriculture (USDA) because it is being paid for the service of converting a meat animal into a meat product. This exemption is described in its entirety in the Code of Federal Regulations (USDA 2003) and is discussed extensively in Carr et al. (2008b). Custom exempt poultry processing facilities have different regulations than red meat facilities (USDA 2006).

A custom exempt red meat facility can only slaughter and process livestock for the exclusive use of the owner(s), and

Gainesville: University of Florida Institute of Food and Agricultural Sciences. http://edis.ifas.ufl.edu/pdffiles/AN/AN20300.pdf

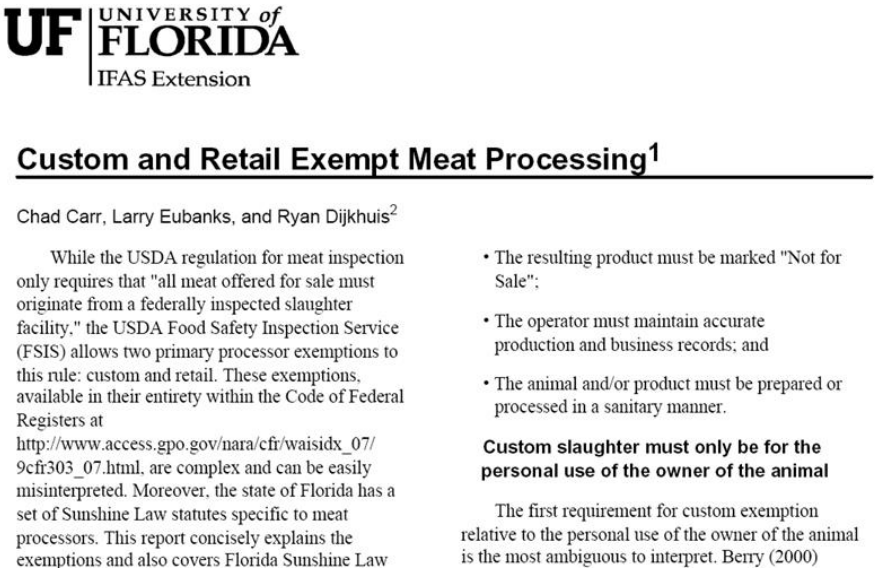
Carr, C. C., L. E. Eubanks, & R. D. Dijkhuis. 2008b. *Custom and Retail Exempt Meat Marketing*. AN204. Gainesville: University of Florida Institute of Food and Agricultural Sciences.. http://edis.ifas.ufl.edu/pdffiles/AN/AN20400.pdf

USDA. 2003. *Exemptions to Federal Meat Inspection*. 9CFR303.1 Food Safety Inspection Service. Washington D.C. https://www.govinfo.gov/content/pkg/CFR-2012-title9-vol2/pdf/CFR-2012-title9-vol2-part303.pdf. (May 23, 2008)

USDA. 2006. *Guidance for Determining Whether a Poultry Slaughter or Processing Operation is Exempt from Inspection*

Retail exemption

- Unrelated, but can be part of discussion
- Many custom slaughter facilities buy inspected trim and sell their own sausage



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Custom and Retail Exempt Meat Processing[1]

Chad Carr, Larry Eubanks, and Ryan Dijkhuis[2]

While the USDA regulation for meat inspection only requires that "all meat offered for sale must originate from a federally inspected slaughter facility," the USDA Food Safety Inspection Service (FSIS) allows two primary processor exemptions to this rule: custom and retail. These exemptions, available in their entirety within the Code of Federal Registers at http://www.access.gpo.gov/nara/cfr/waisidx_07/9cfr303_07.html, are complex and can be easily misinterpreted. Moreover, the state of Florida has a set of Sunshine Law statutes specific to meat processors. This report concisely explains the exemptions and also covers Florida Sunshine Law

- The resulting product must be marked "Not for Sale";
- The operator must maintain accurate production and business records; and
- The animal and/or product must be prepared or processed in a sanitary manner.

Custom slaughter must only be for the personal use of the owner of the animal

The first requirement for custom exemption relative to the personal use of the owner of the animal is the most ambiguous to interpret. Berry (2000)

http://edis.ifas.ufl.edu/pdffiles/AN/AN20400.pdf

If you find someone to slaughter them under inspection….

- And.. If you have a butcher shop- products can be marketed under retail exempt

USDA Retail Exempt Processing

CANNOT

- Slaughter without Federal inspection.
- Can meat without Federal inspection.
- Sell to other retail markets.
- Sell to wholesalers or distributors.

Frequent Retail Exempt Question

- The processor must own the facility or pay for the facility's usage & can not have more than two markets opened at the same time.
- A retail exempt processor could have their permanent retail store and go to a farmer's market on each day of the week or sell from a roadside stand or truck as long as no more than two were open on the same day.
- The processor's total sales to food service can't exceed 25% of their total annual sale.
- The processor only sells fresh products to food service (not cooked, smoked, cured, or canned).

Normal Retail Quantity

- Cattle – 300 lbs.
- Sheep - 27.5 lbs.
- Swine – 100 lbs.
- Goats – 25 lbs.

Freezer lamb

- Opportunity to add value
- FSIS inspected- can be piece by piece
- Custom- Sell carcass, side, or quarter
- < 100 freezer lambs annually

Freezer lamb from seller to butcher

- Generally the producer will take it to the processor, but that should be negotiated.
- However, getting a date/appointment with a processor is extremely challenging right now.

Value

- https://www.ams.usda.gov/mnreports/sa_ls850.txt

Let's consider a 130 lb lamb

- 130 lbs = 1.3 hundred wts * 200 cwt= $260 value of the lamb
- Processor fees will vary- but a slaughter fee of $100 and a charge of $0.65 per pound of hot carcass wt is reasonable
- 130 lb lamb will dress 52% = 68 lb hcw
- 68 * 0.65 = $44 cut & wrap + $100 slaughter fee = $144 for processing.

Let's consider a 130 lb lamb

- Total cost $260 + 144 = $404
- Let's use the 75% of HCW of 68 lbs as an estimate of bone-in lamb cuts = 51 lb----
- $404/51 lb = $7.92 per lb- That's your breakeven
- * 33% overhead/profit = 10.54 per lb avg retail meat price

Take Home

- Online/local
  - temporary or sustaining?
- Freezer lamb
  - Can work if you are willing to commit

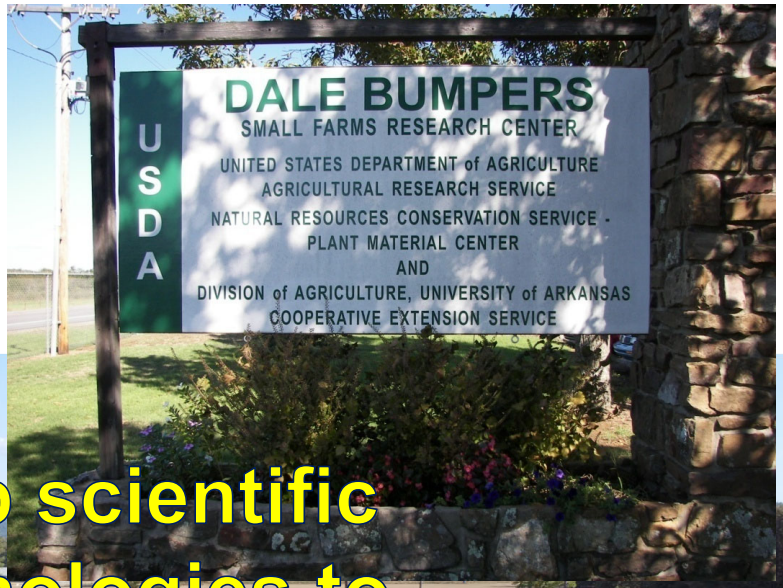
Strategies for Reducing Internal Parasites in Small Ruminants

Joan M Burke

Research Animal Scientist

USDA, ARS, Dale Bumpers Small Farms Research Center
Booneville, AR

Please see www.wormx.info for more information on topics presented



Mission: To develop scientific principles and technologies to enhance the profitability of small scale farms.

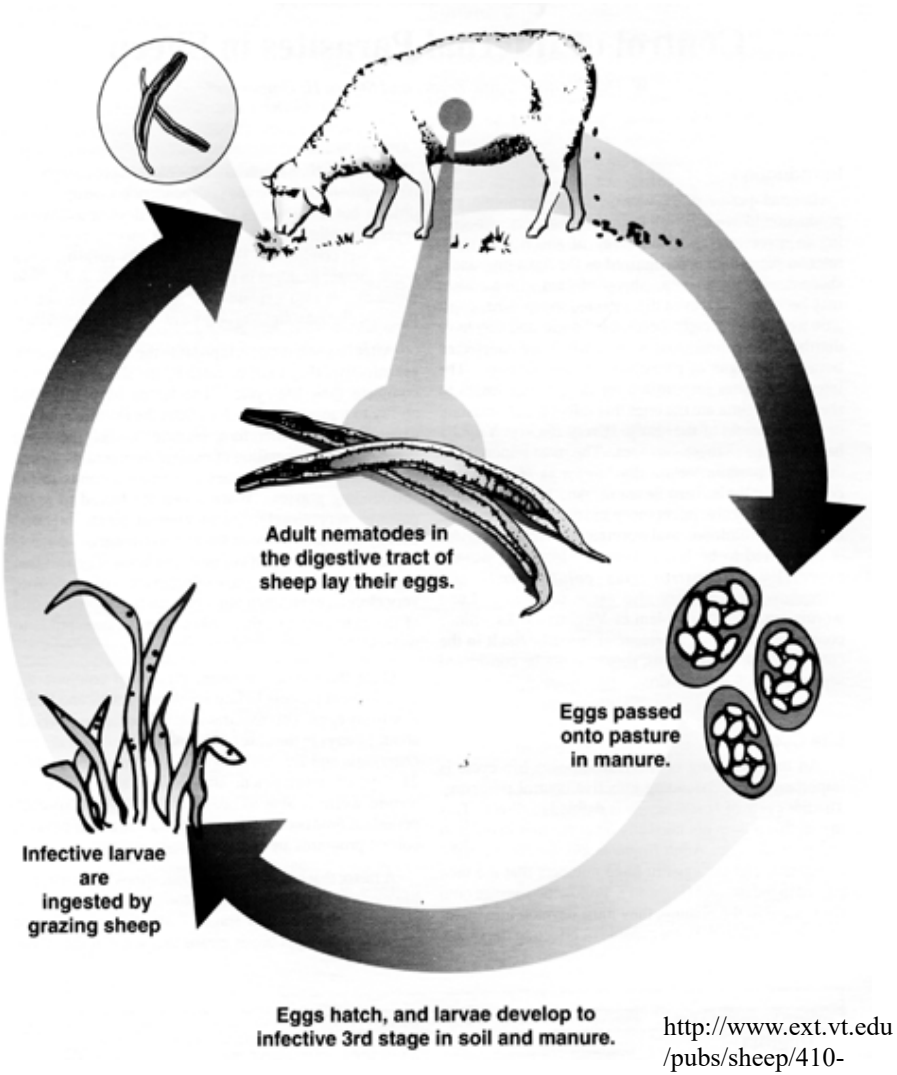
Overview

- Biology and background
- Alternative approaches
  - Sericea lespedeza
  - Copper oxide wire particles
  - *Duddingtonia flagrans*
  - Genetic/genomic Selection
- Other considerations
- American Consortium for Small Ruminant Parasite Control (www.wormx.info)

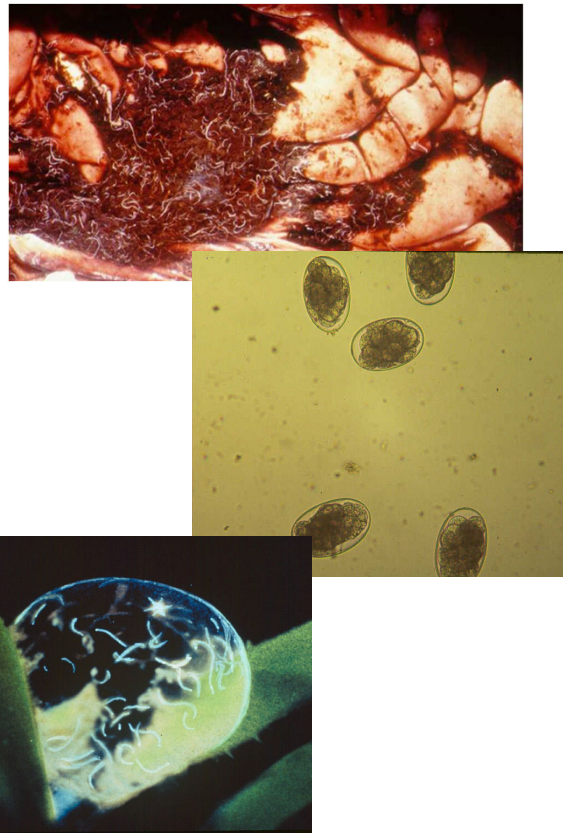
Haemonchus contortus (Barberpole Worm)

- Sheep, goats, deer, exotic ruminants
- Blood-sucking worm - Highly pathogenic, causes anemia, bottle jaw
- Most important worm parasite in warm humid climates (others include *Trichostrongylus* spp. which causes diarrhea; and a protozoan parasite, coccidia (*Eimeria* spp.) which can also lead to diarrhea.
- In the southeastern U.S., most worms are resistant to available dewormers. Uh oh! We need alternatives!!

Life Cycle of *H. contortus*

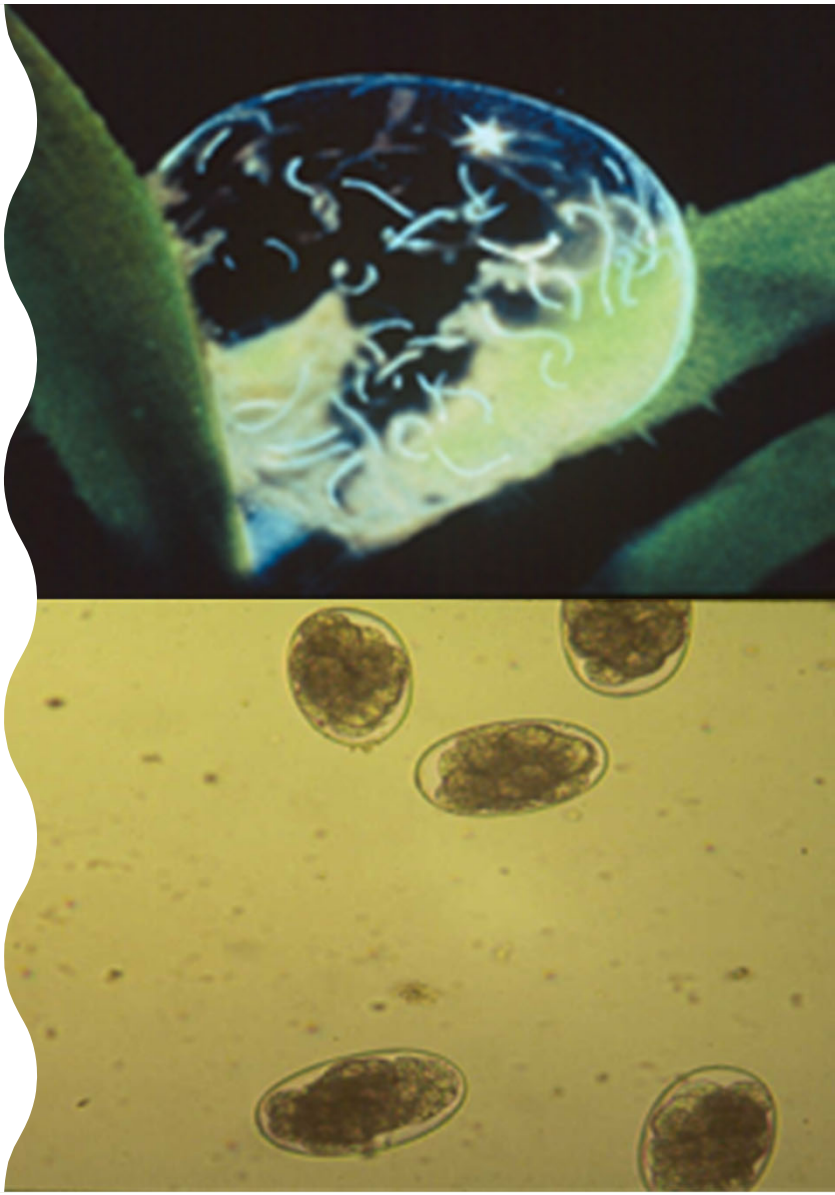


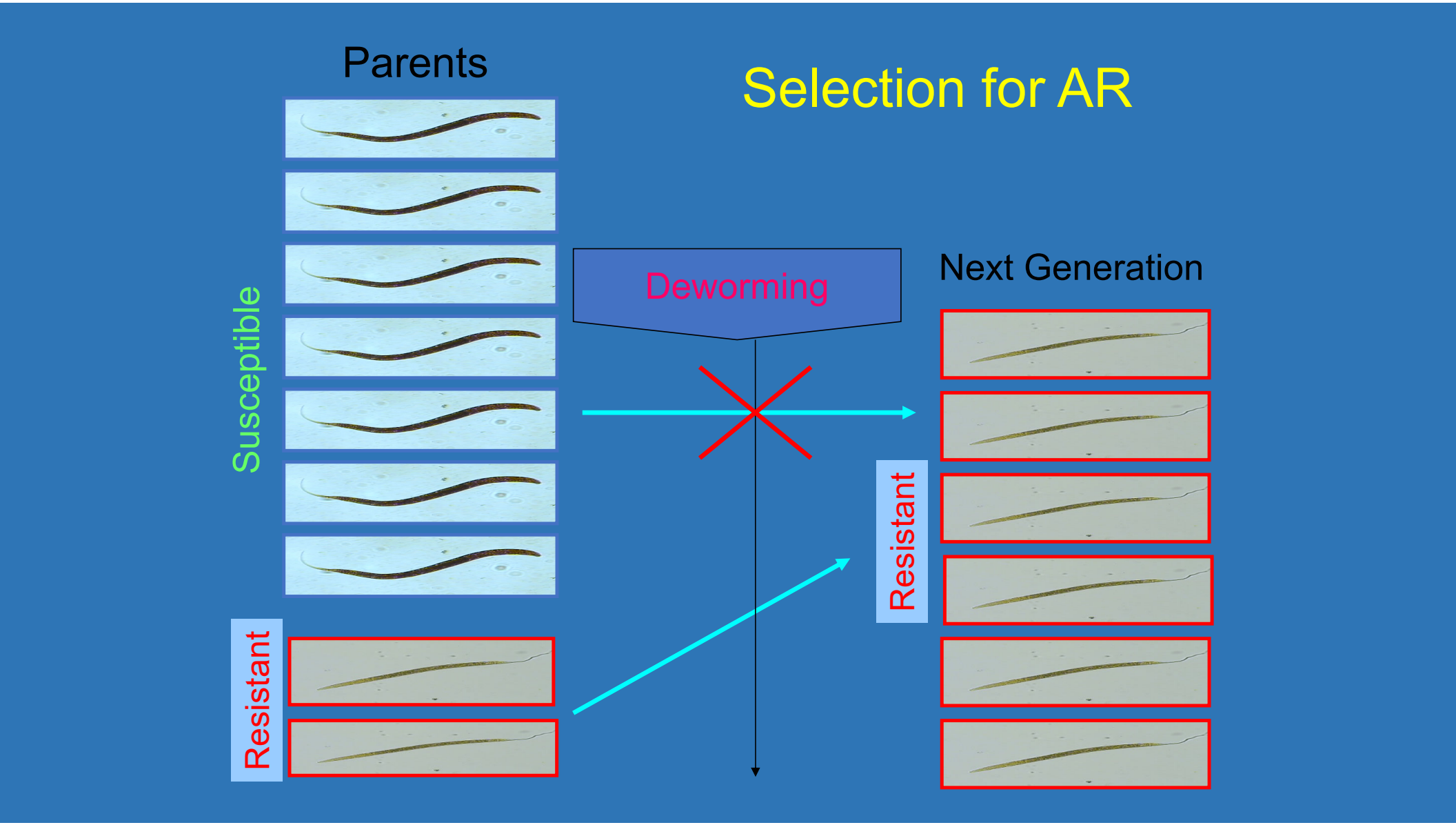
http://www.ext.vt.edu/pubs/sheep/410-027/figure1.html



Why is *H. contortus* such a problem?

- **Evolved in tropics, thrives in warm/wet climates**
- **Very fecund, ~ 5,000 eggs per day: 30 goats/sheep → 300 worms/animal → 1.5 million eggs per day per animal → Over 1 billion eggs per month**
- **Long transmission season - southeastern US**
- **Short life cycle – 4/5 weeks during summer**
- **Immunity to worms is slow to develop. Can take up to 6-8 months of age; Immunity wanes around the time of parturition**

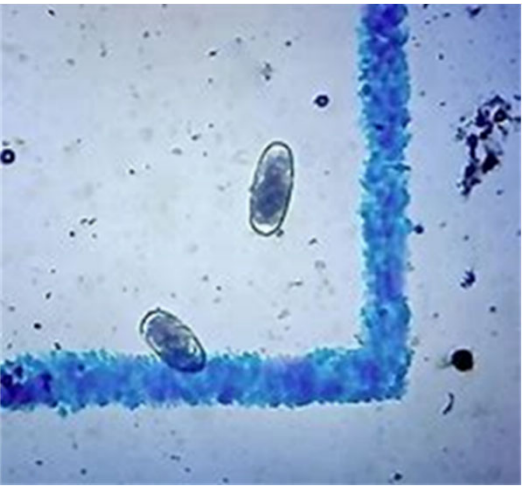



Parents
Selection for AR
Susceptible
Deworming
Next Generation
Resistant
Resistant

Goal is to use selective deworming to maintain refugia (worms that will respond to dewormer)

The more of the population that is in refugia, the slower the rate with which resistance develops

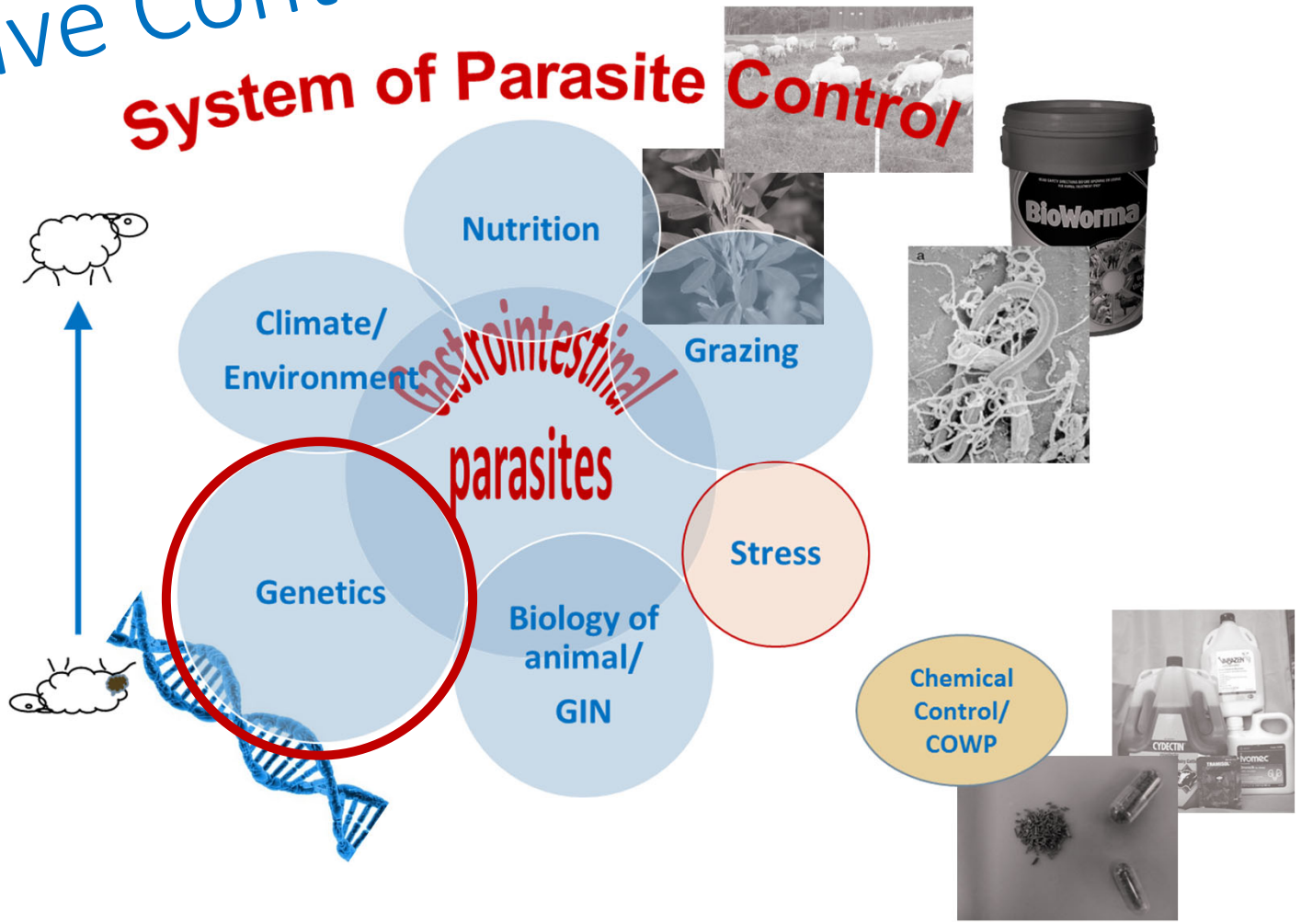
Selective deworming significantly increases the percent of the population in refugia



How to Achieve Selective Deworming

- ID Poor doing animals (lag behind, poor condition, bottle jaw)
- Fecal egg count (FEC) of a group
- The FAMACHA© system - Indirectly evaluate worm burden of Hc by level of anemia
- Selective deworming leads to a substantial reduction in dewormer usage
- ACSRPC | FAMACHA (wormx.info)

Alternative Control



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Agricultural Research Service

Xvh#ri#wdqqlq#
ulfk#irudjhv#vxfk#
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ACSRPC: Sericea lespedeza (wormx.info)

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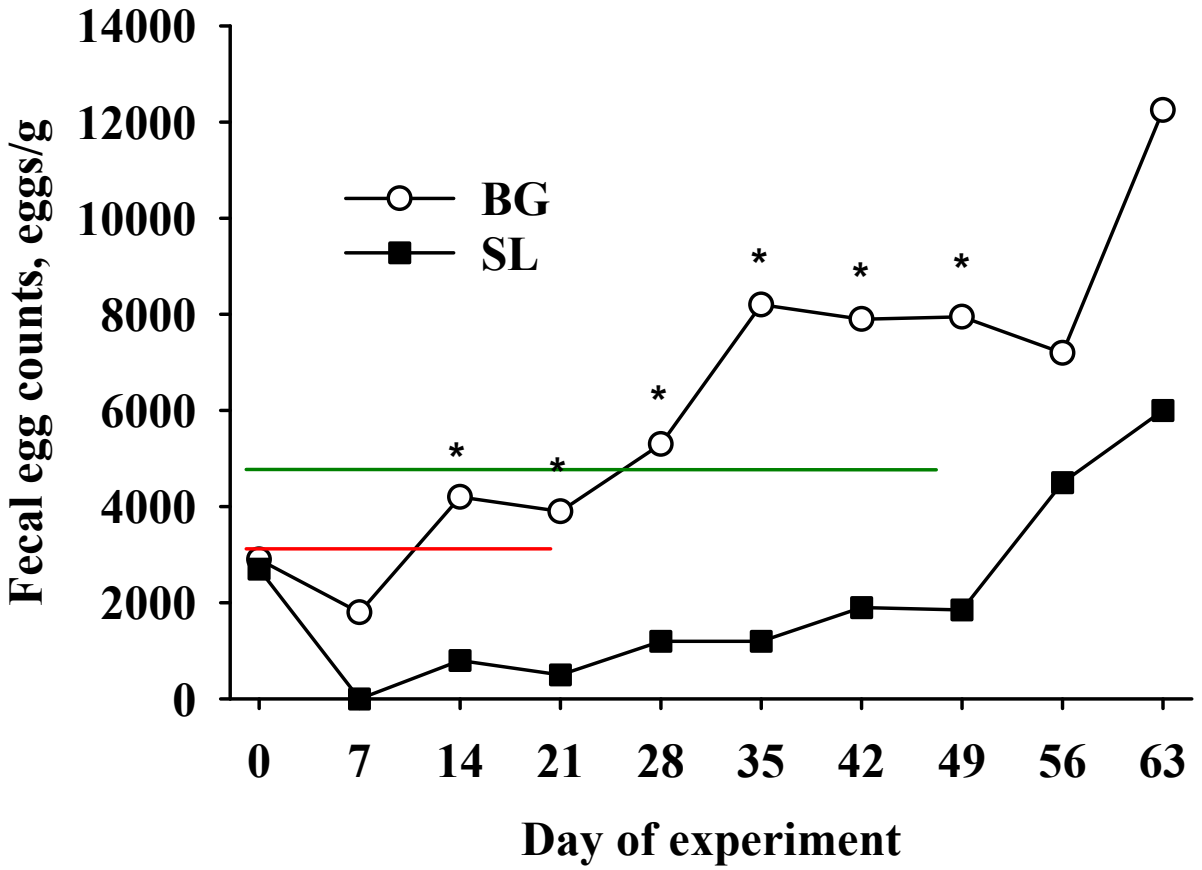
Effect of lambs fed BG or SL hay on FEC (LSU)



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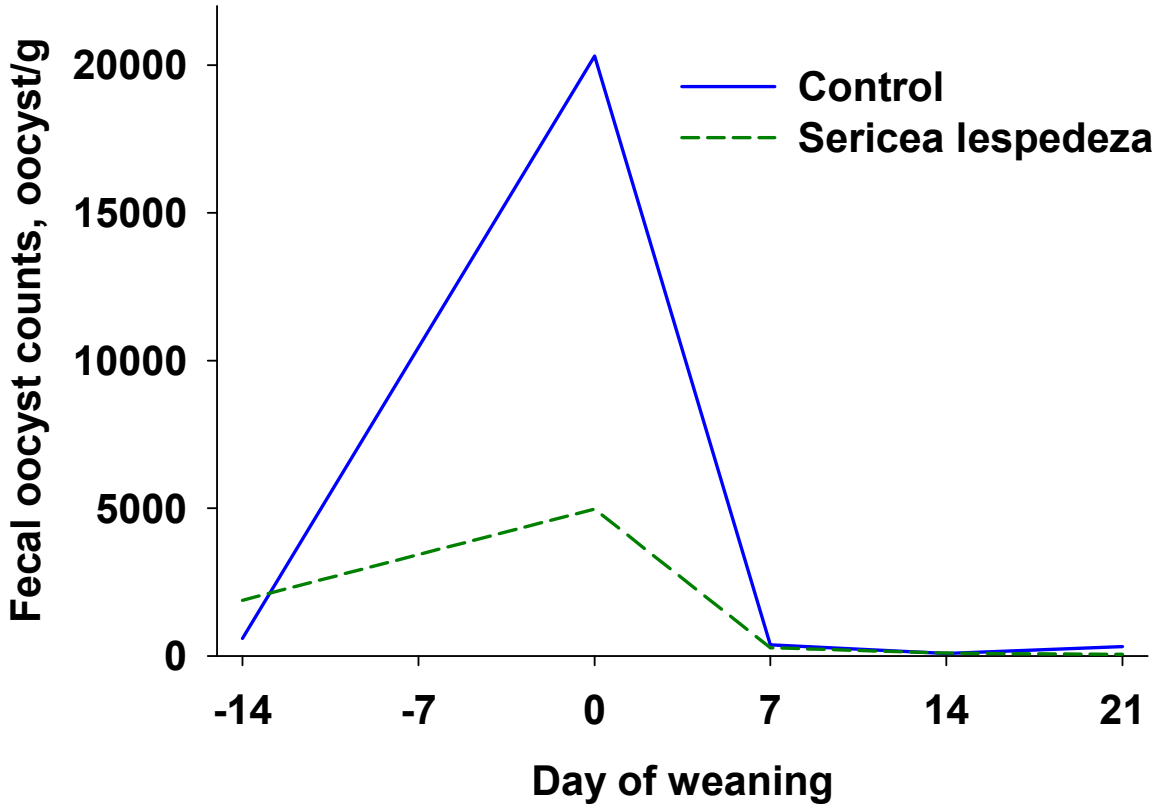
Effect of lambs fed alfalfa or SL pellets on coccidia



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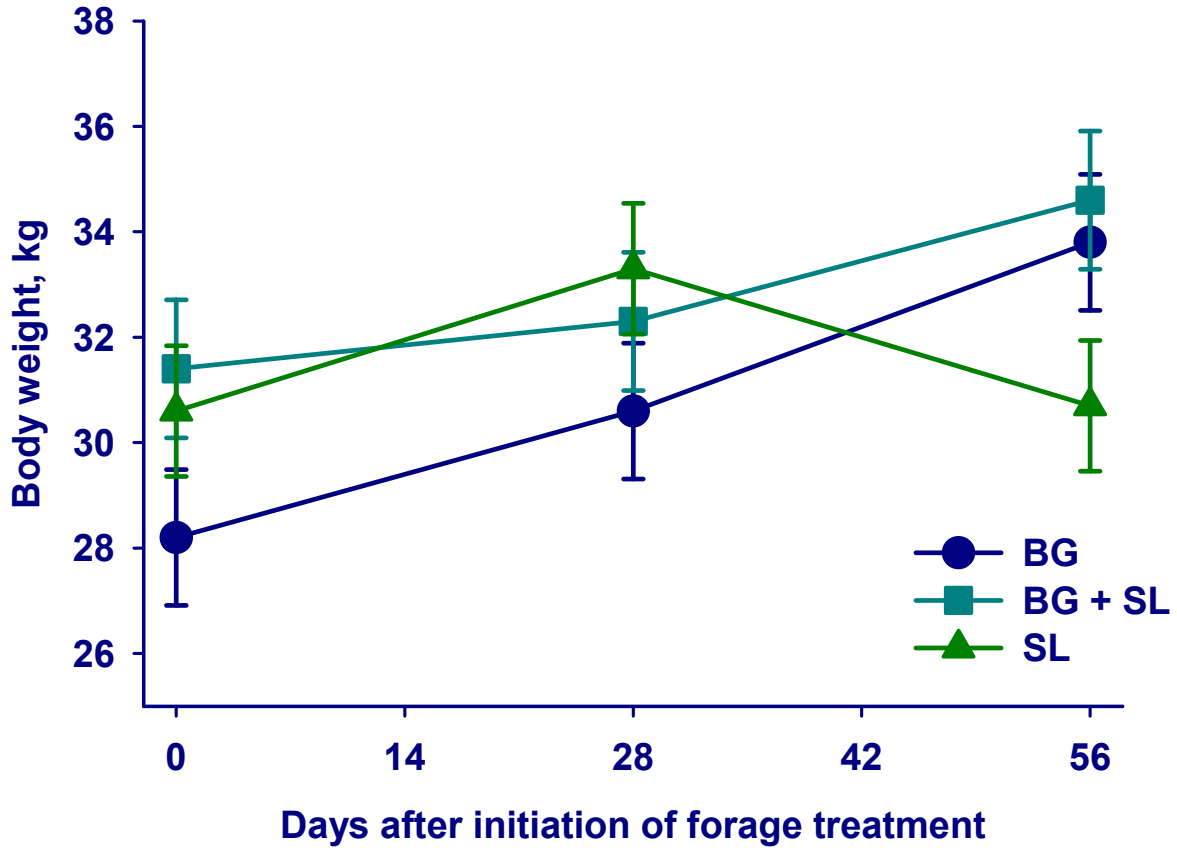
Effect of grazing SL on growth of lambs - 2009



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COWP

- **Copper oxide wire particles (COWP) have been used to treat copper deficiency**
- **COWP become lodged in the abomasum resulting in expulsion or death of the adult nematode**
- **COWP have been used in sheep and goats to reduce GIN in the animal**
- ACSRPC | COWPs (wormx.info)

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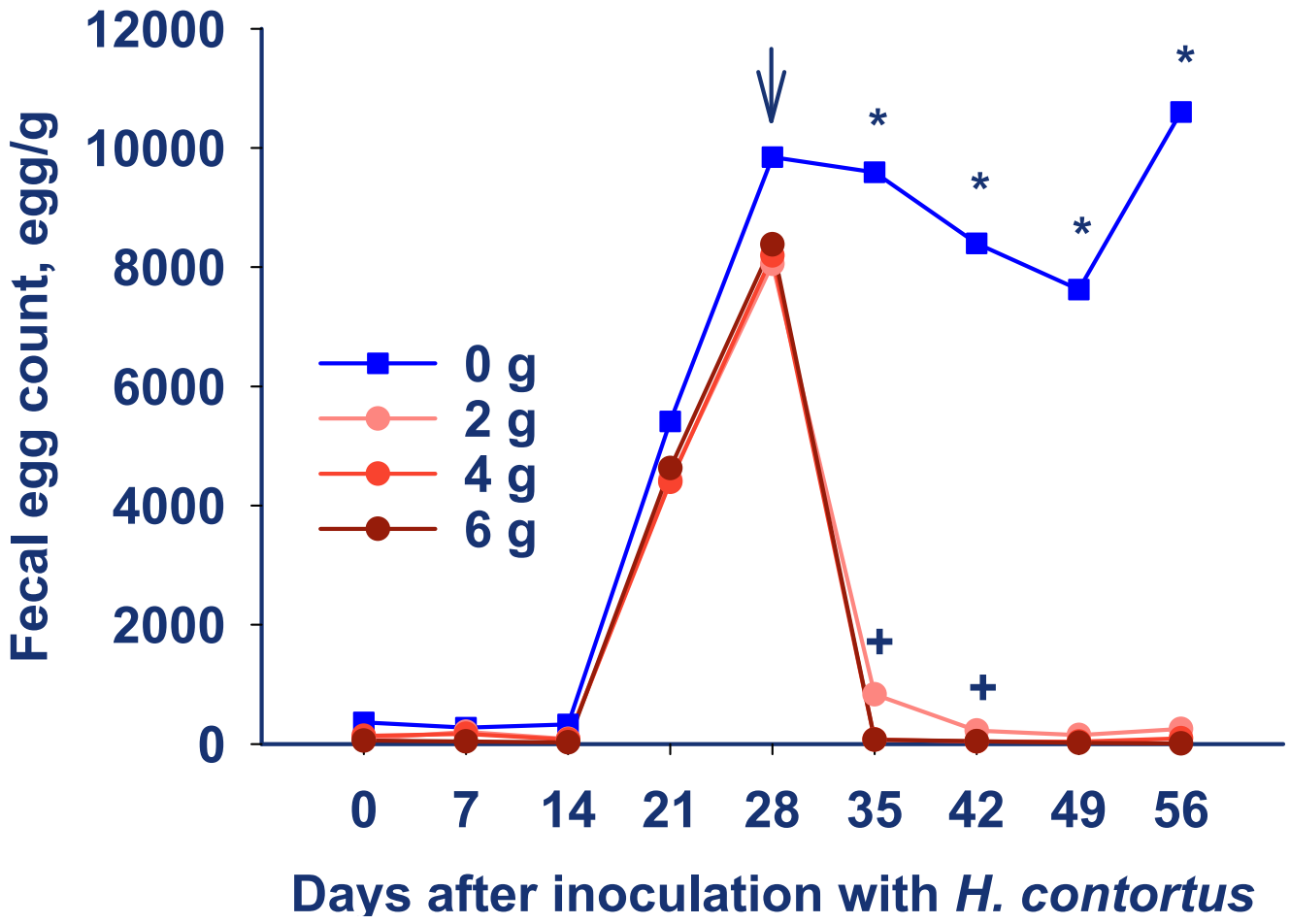
Effect of COWP on FEC of lambs



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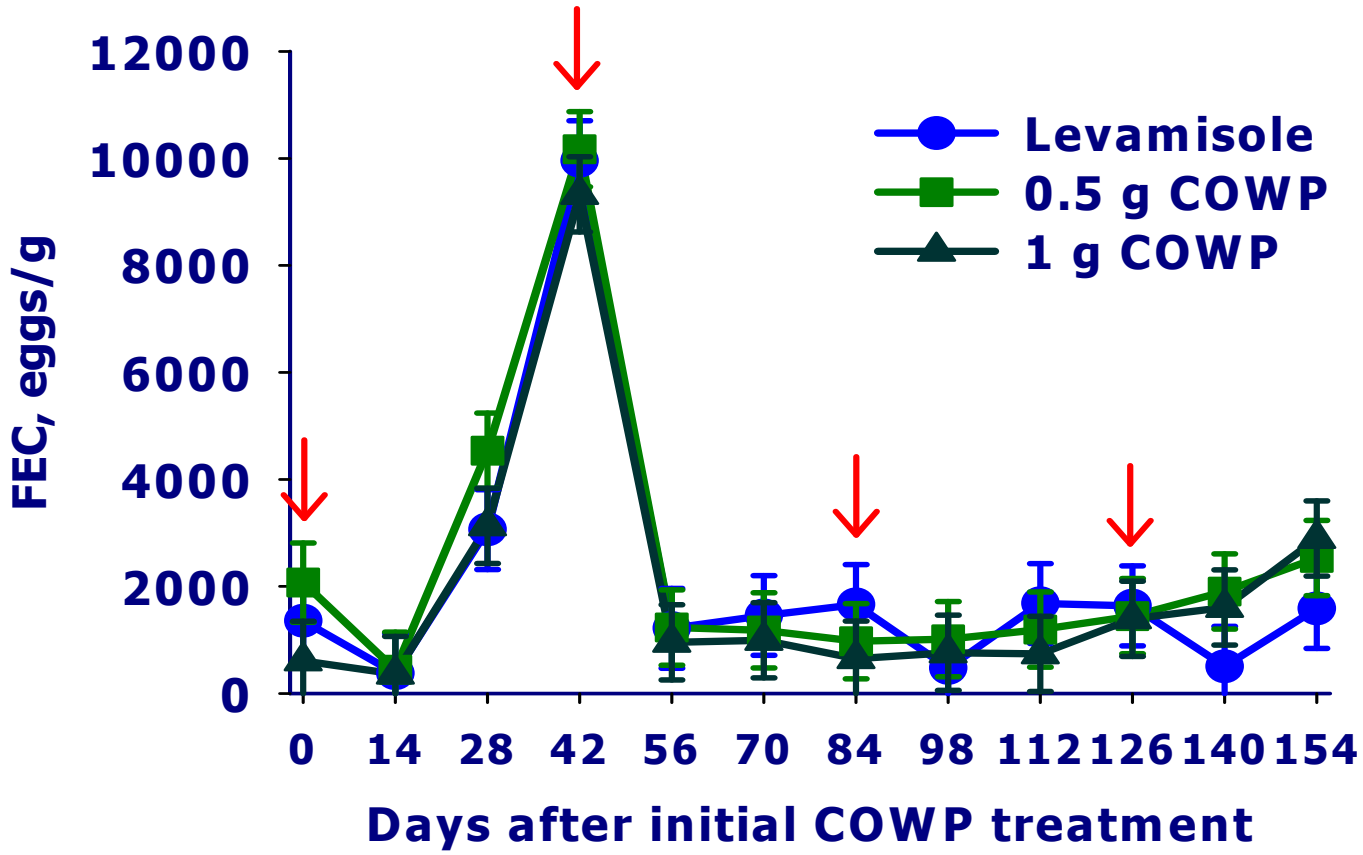
Effect of COWP on FEC



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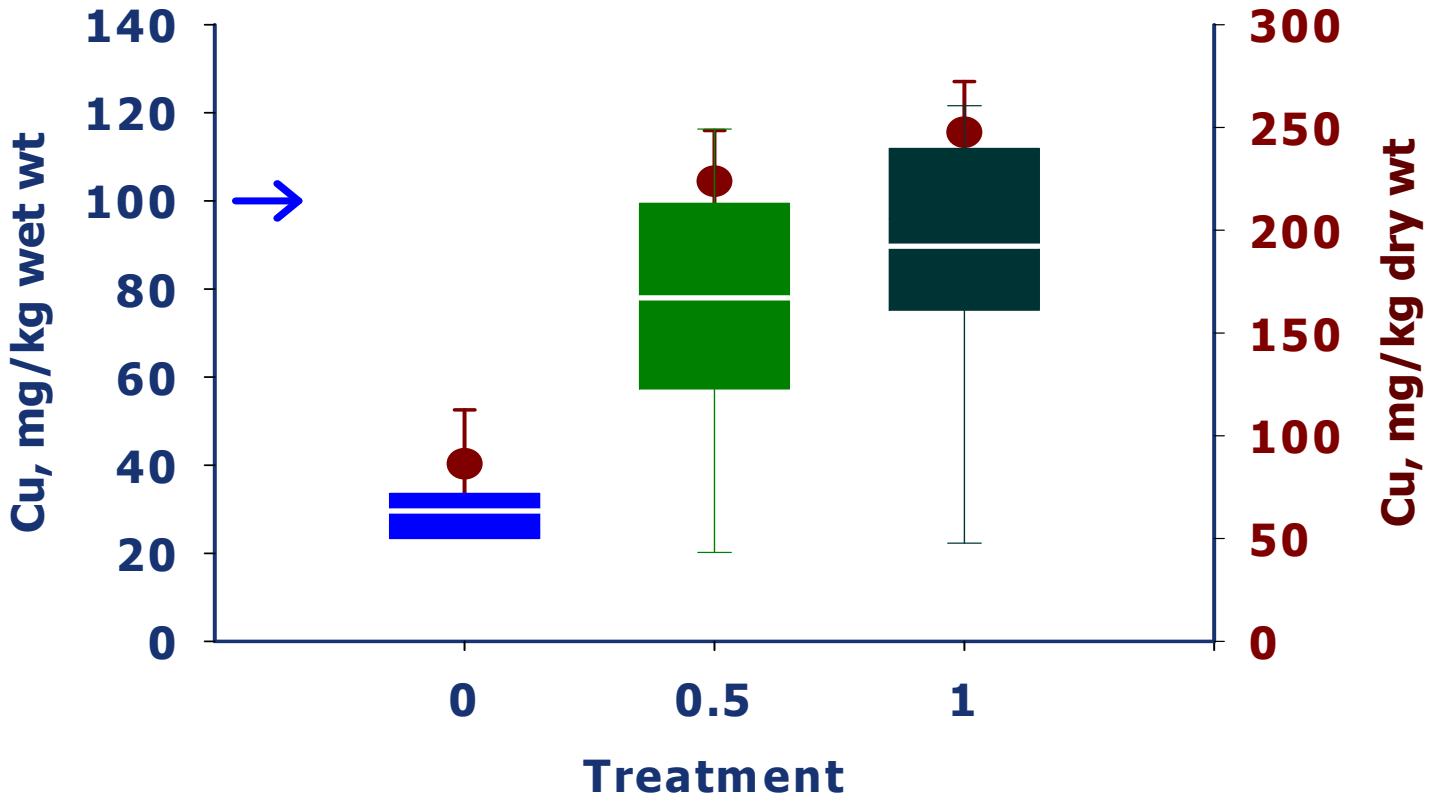
Effect of COWP on concentrations of copper in the liver



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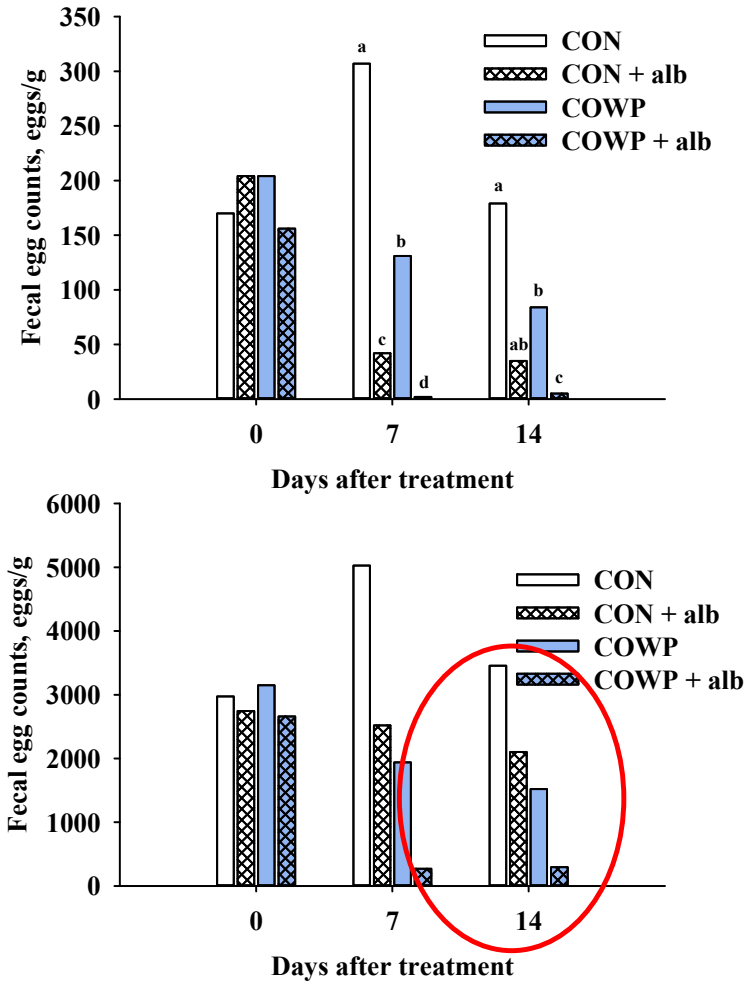
- **When used in combination with levamisole or albendazole, effective against other worms (by itself, only barber pole worm).**
- **Increased efficacy by ~30%.**
- ACSRPC | Using COWP to increase dewomer efficacy (wormx.info)

FEC means in response to COWP and albendazole



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COWP

- **COWP available in the U.S. as Copasure (Animax) for cattle and goats and Ultracruz (Santa Cruz Animal Health) for goats.**

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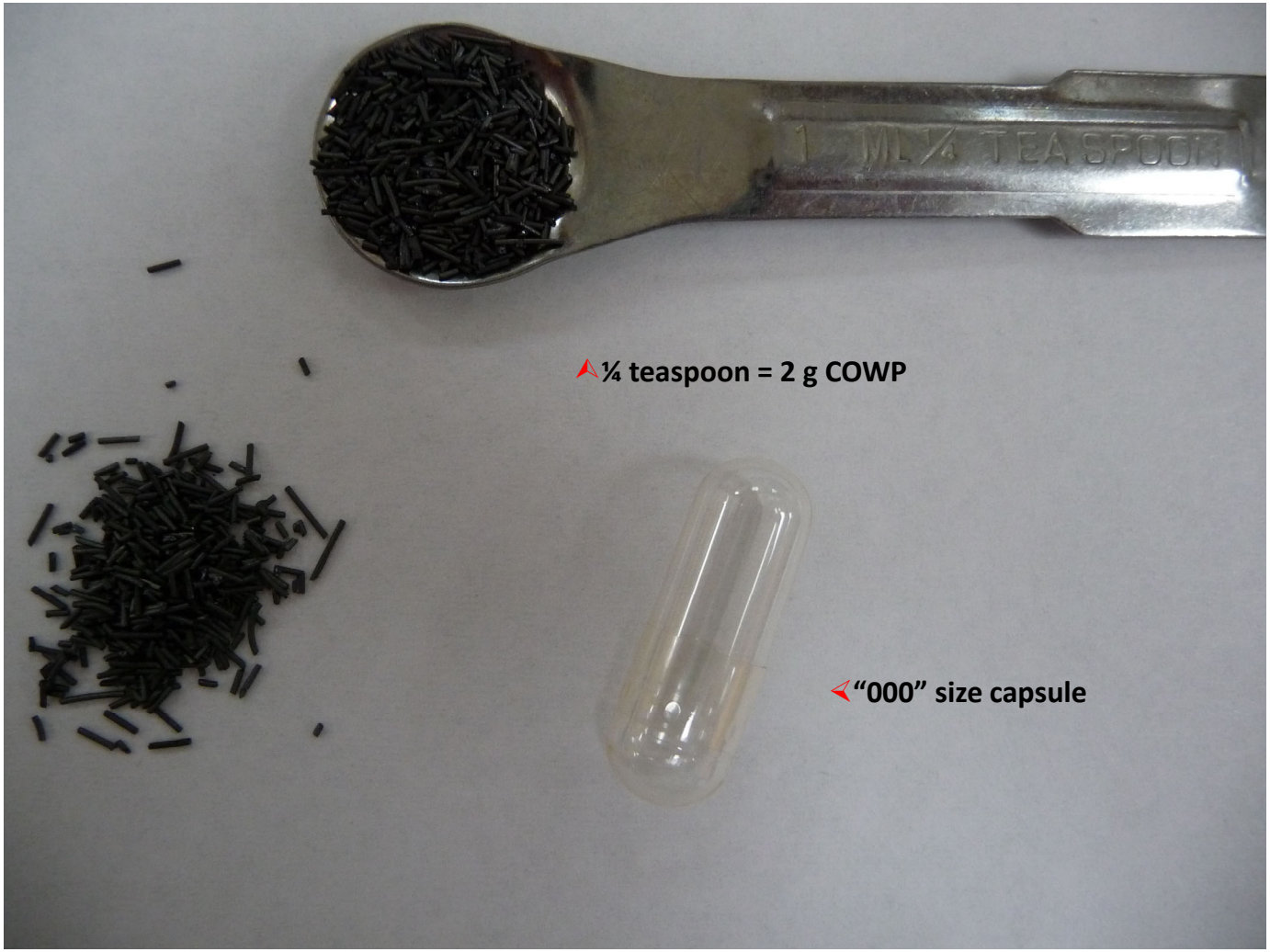

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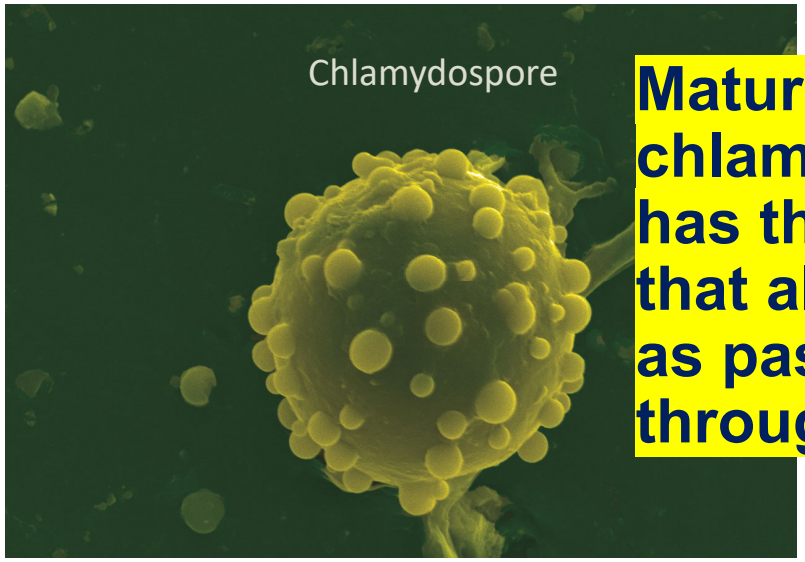
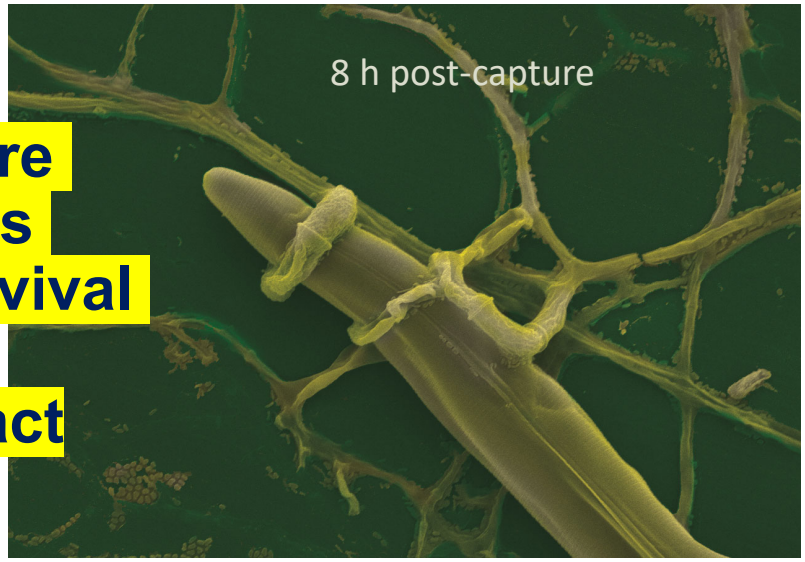
BioWorma® - *Duddingtonia flagrans* (Df)

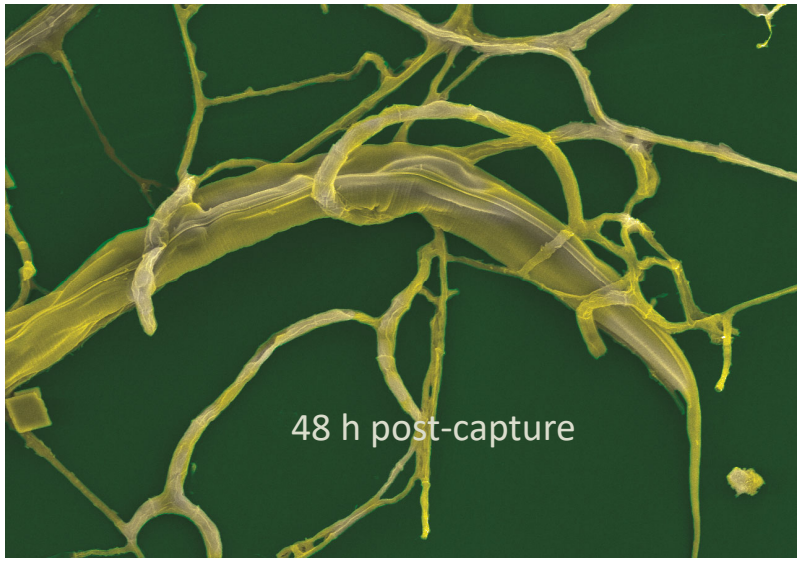
- **Nematode-trapping fungus**
- **Fungal spores are fed to animal in feed supplement and pass through to feces (no effect to animal).**
- **Gastrointestinal nematode or worm larvae develop along with Df. Df trap the larvae, paralyze and consume it.**
- **Estimated that 10% of GIN in animal, 90% on pasture (Wormboss.com.au)**
- **Effective against multiple worm species and resistant worms.**
- **Available through select feed mills, veterinarians, Premier1.**
- **Df is a naturally occurring fungus in soil and not detrimental to soil nematodes, environment (Faedo et al., 2002; Knox et al., 2002; Yeates et al., 2002; Saumell et al., 2015).**

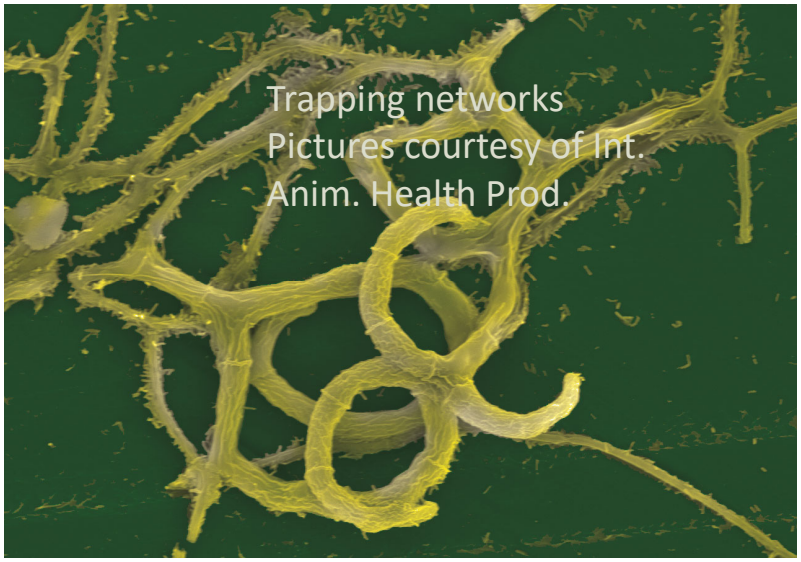
USDA Agricultural Research Service

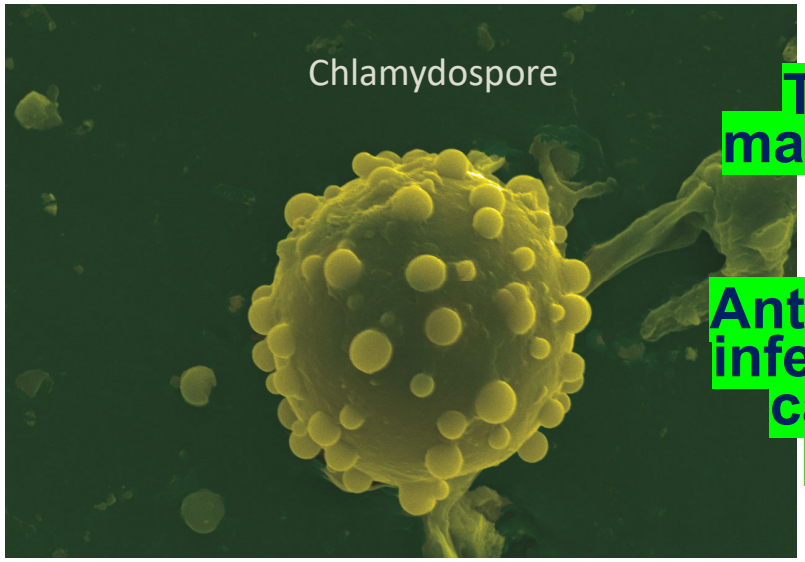


Mature chlamydospore has thick walls that allow survival as passes through GI tract



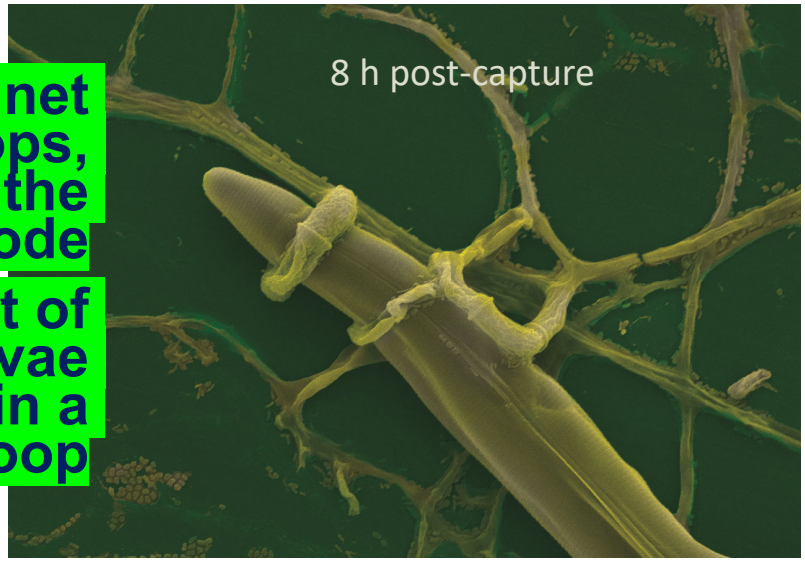


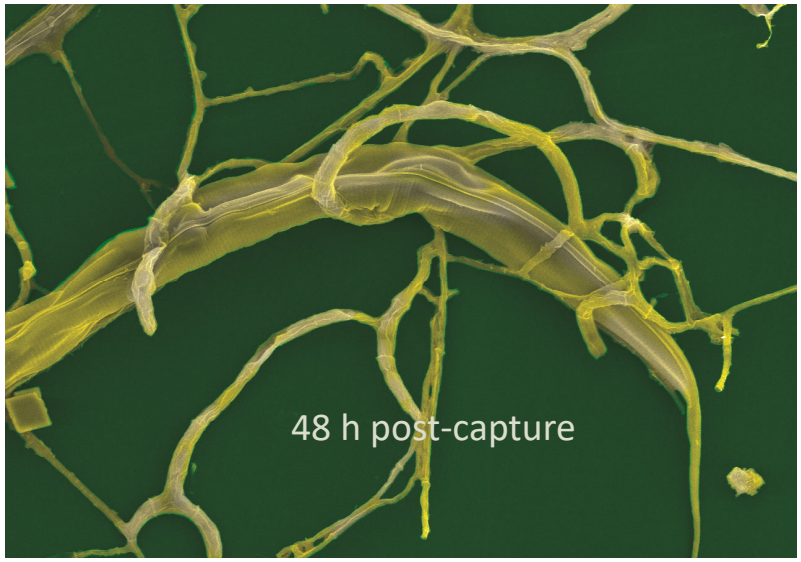


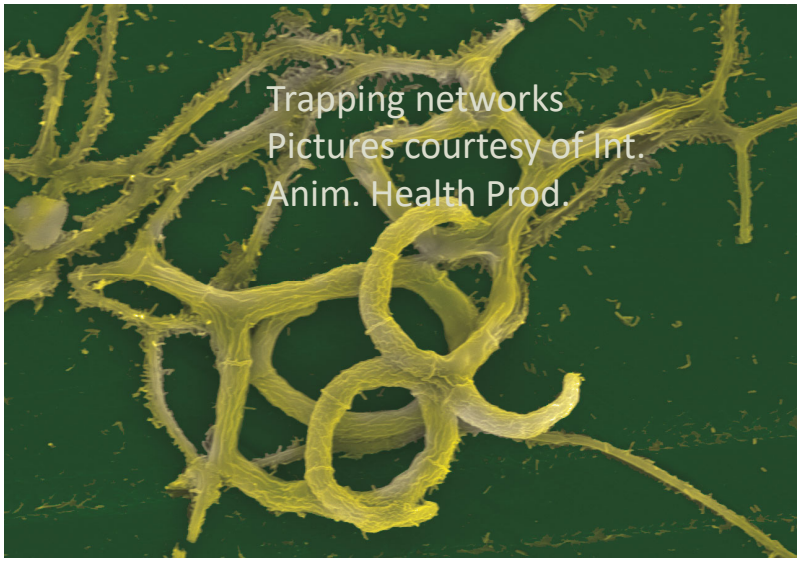


Trapping net made of loops, traps the nematode

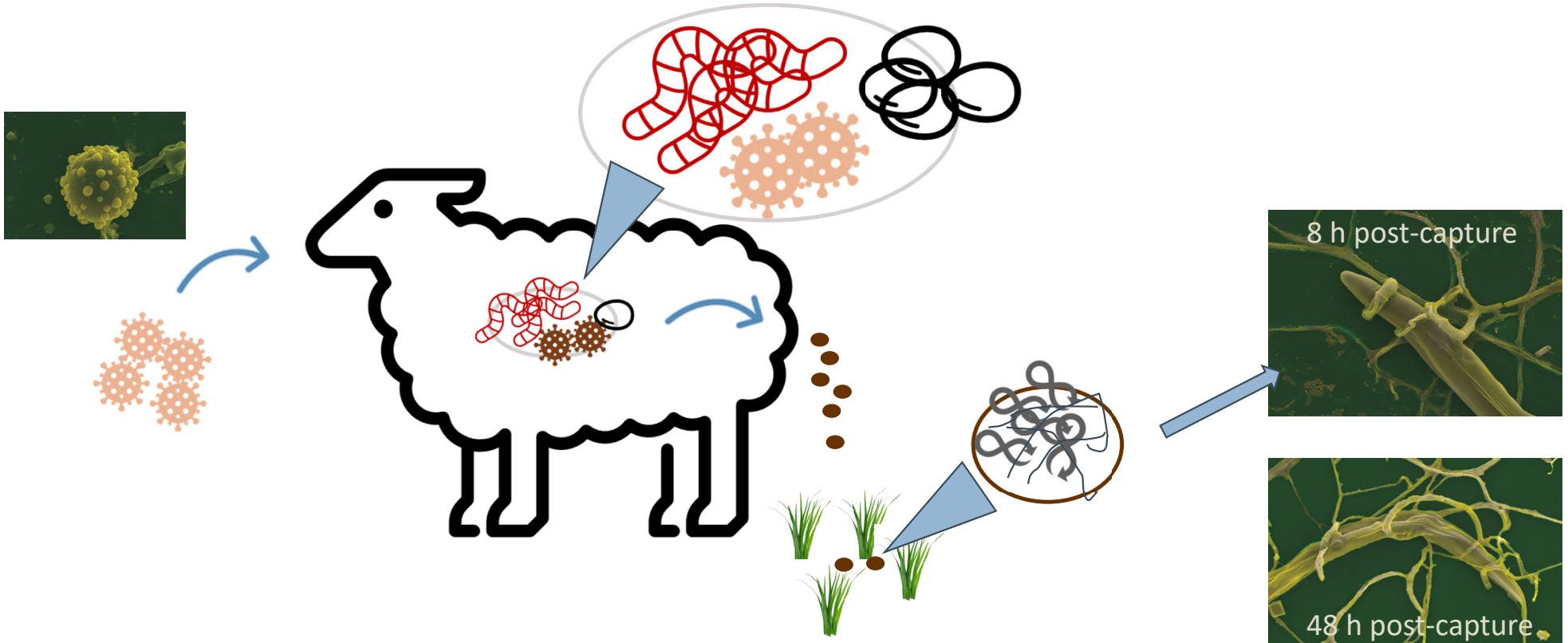
Anterior part of infective larvae captured in a hyphal loop







Journey of nematode-trapping fungus (Df)



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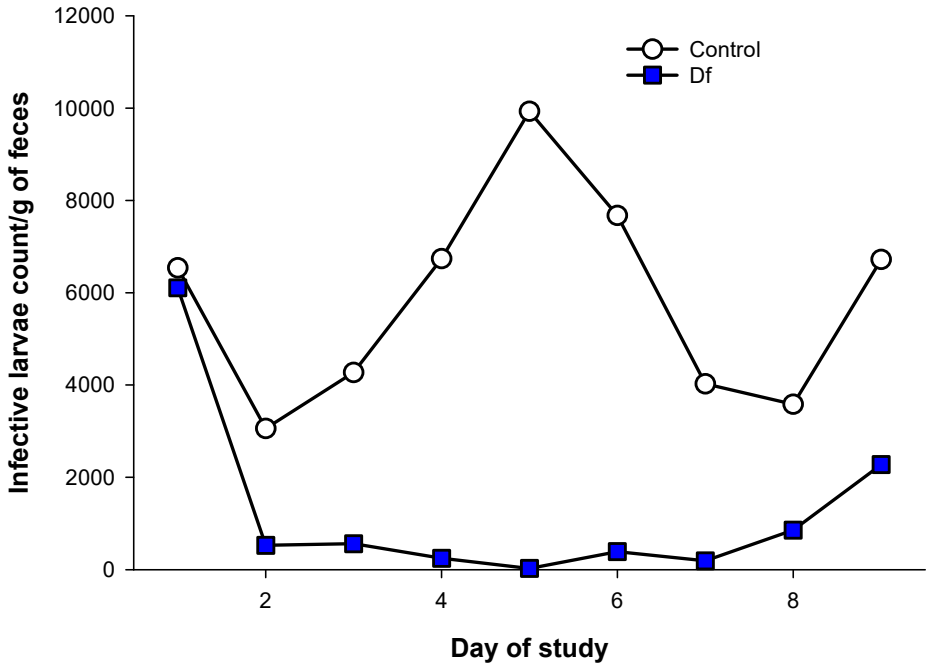
Agricultural Research Service

Effect of Df fed to lambs on larvae counts over time (Peña et al, 2002)

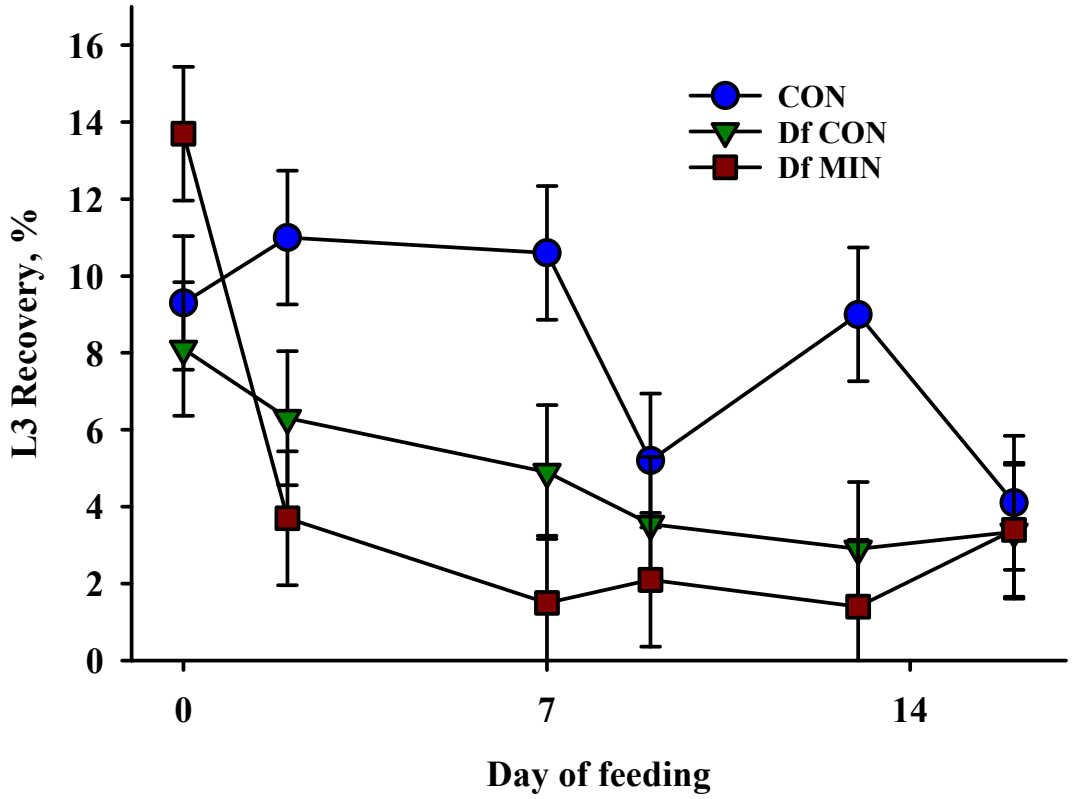


Abstract 61, Jan 29, 2024

AMERICAN SOCIETY OF ANIMAL SCIENCE SOUTHERN

USDA Agricultural Research Service

Effect of Df on feed or loose mineral on larval recovery



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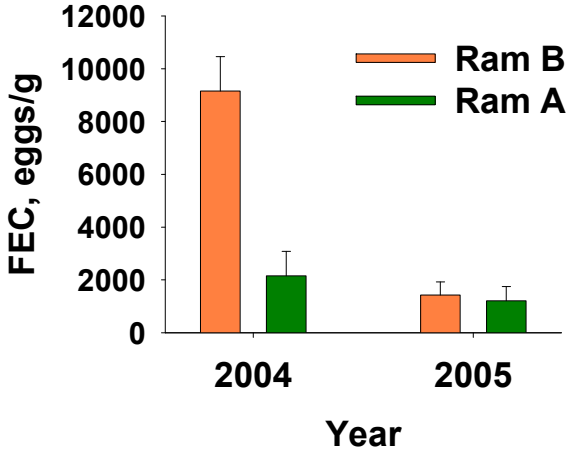
Agricultural Research Service

Using genetics for selection of parasite resistance

- **An animal's ability to resist parasites is heritable (0.18 - 0.23)**
- **USDA, ARS progeny of sires have been evaluated since 2004 for parasite resistance (FEC) and tolerance (PCV and FAMACHA), growth, and maternal traits.**



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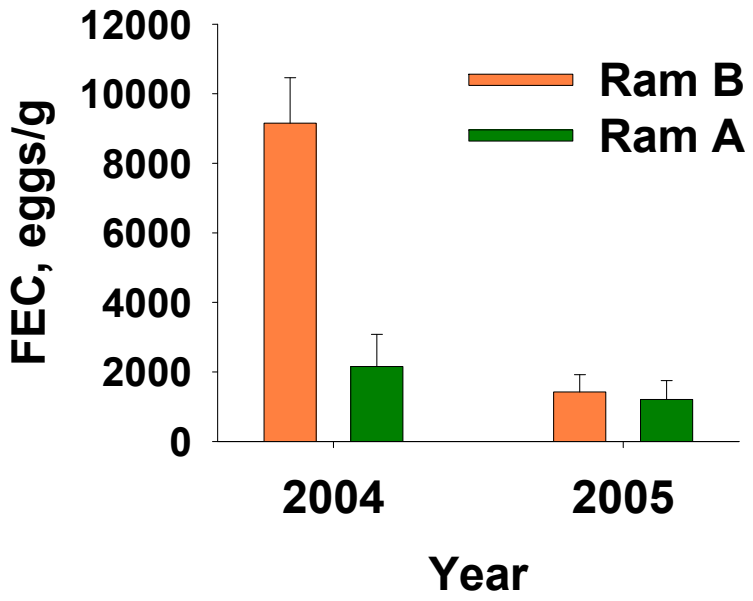
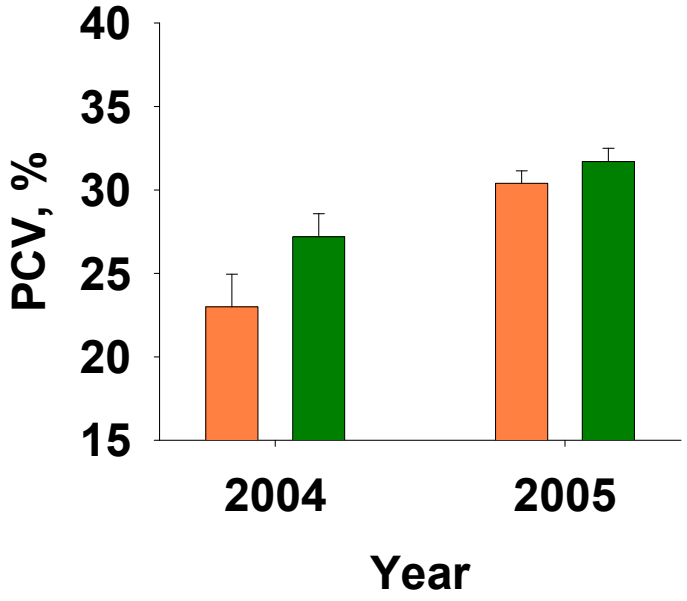
Agricultural Research Service

FEC and PCV of offspring sired by Katahdin rams A or B at 120 d of age (Burke & Miller, 2008 Vet. Parasitol. 153, 85)

Ram A:
WWEC = -21
PWEC = -3

Ram B:
WWEC = +178
PWEC = +119





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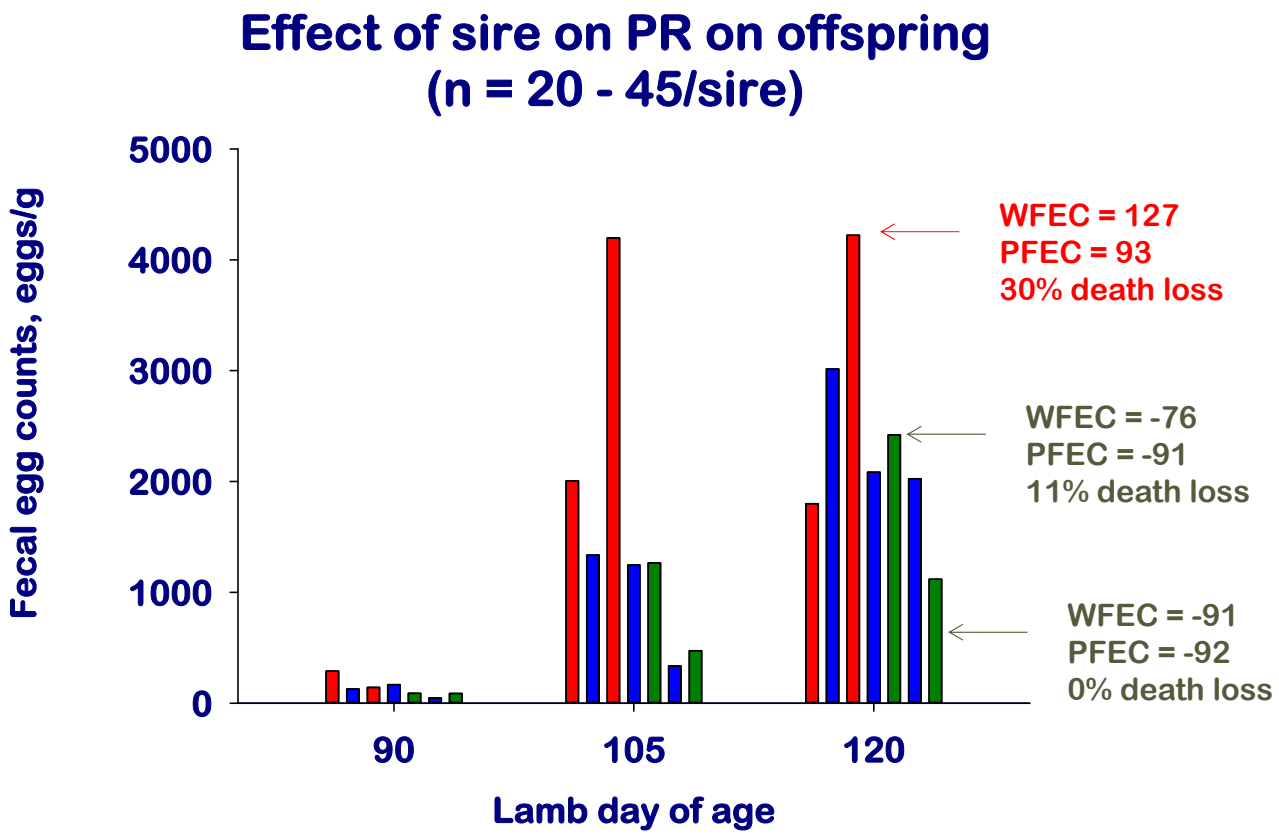
Comparing offspring FEC among sires



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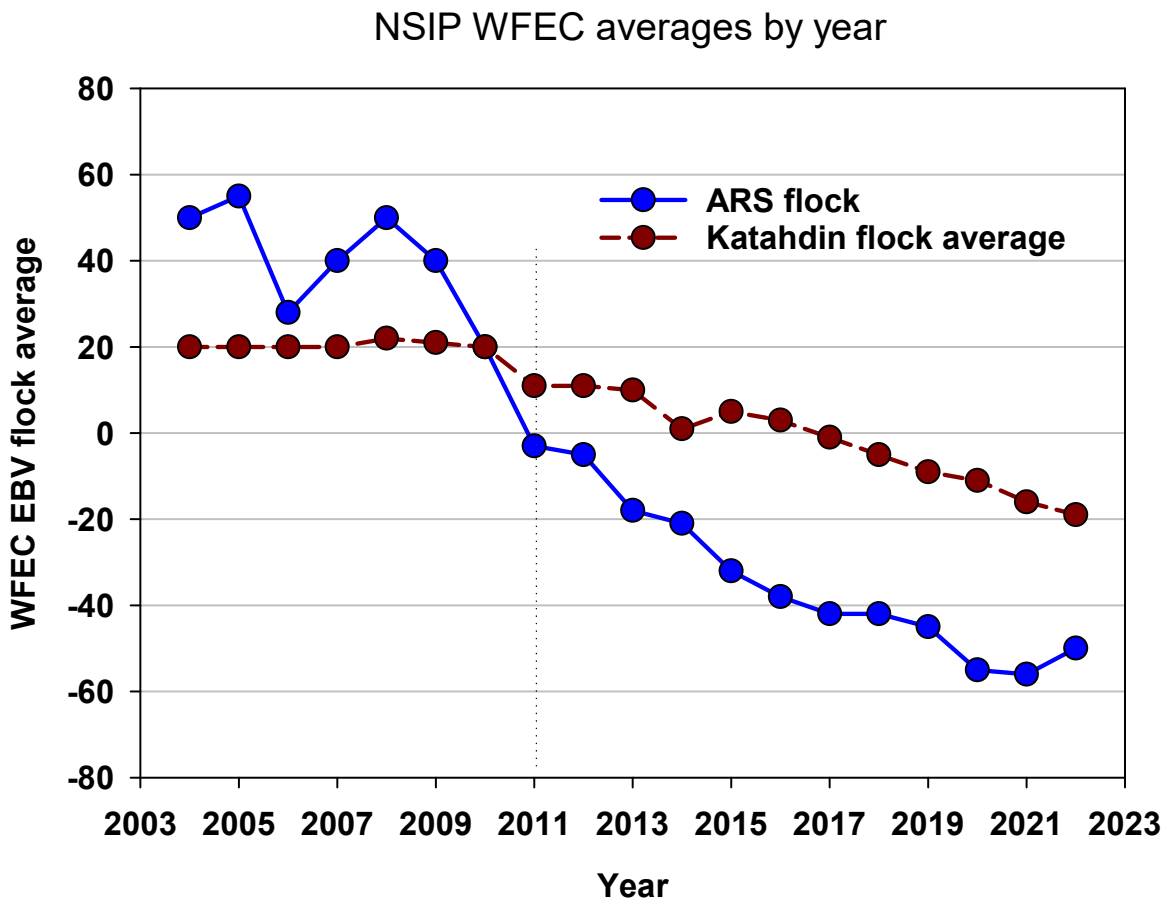

Nutrition

- Nutrition is extremely important in managing GIN.
- The most important measure of good nutrition is body condition.
- Increased protein during times of stress increases resilience to GIN. Can be provided as a supplement or good forages (test if not sure the quality!)
- ACSRPC | Understanding Risk Factors (wormx.info)
- C:\Users\sschoen\AppData\Local\Temp\msoB50C.tmp (wormx.info)

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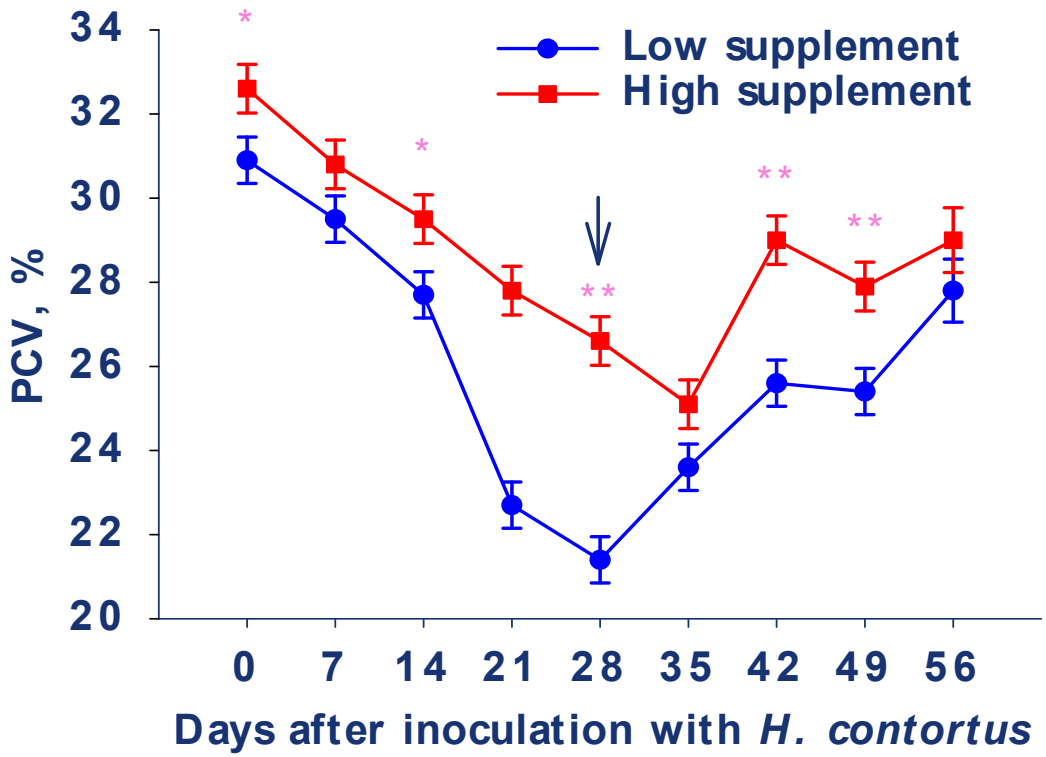
Nutrition

Effect of supplement on PCV



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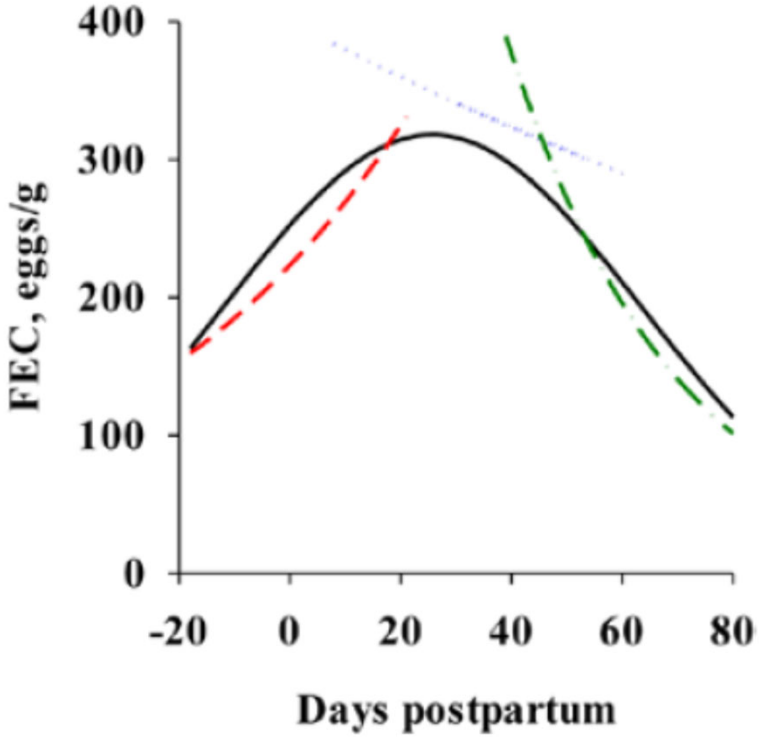
Peri-parturient Rise

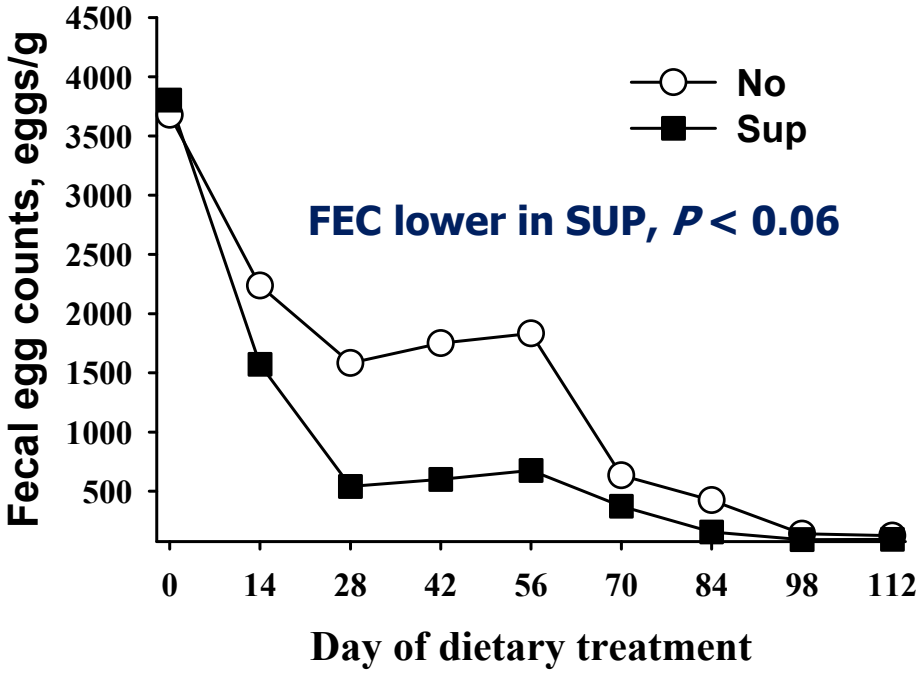
- **Immune suppression around the time of kidding leads to increased FEC/parasite infection**
- **Moderately heritable trait**
- C:\Users\sscho\AppData\Local\Temp\mso145C.tmp (wormx.info)

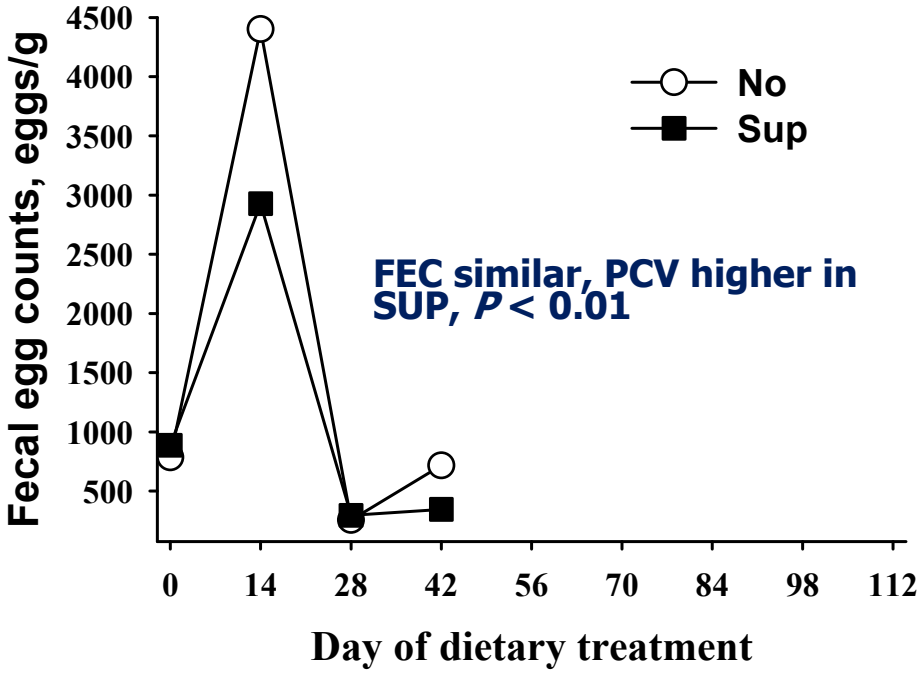


USDA NIFA United States Department of Agriculture National Institute of Food and Agriculture

SOUTHERN SARE Sustainable Agriculture Research & Education

Effect of season and supplementation on FEC





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Things that DO NOT work

- Herbal dewormers (Mollys, Hoeggers)
- Garlic – no effect (ARS, LSU)
- Papaya – no effect (ARS, Heifer Ranch)
- Diatomaceous earth – no effect
- Ginger – No good evidence
- ACSRPC | Herbal dewormers (wormx.info)
- Copper sulfate – do not include extra in mineral. Can kill sheep.

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Other Considerations

- Look at animals. Pay attention to those lagging behind or that look different: head hung down, lying down/not getting up, bottle jaw.
- Select the best, cull the rest using measures such as 5-Point Check, EBVs.
- Quarantine new animals and triple deworm.
- See www.wormx.info (Amer. Cons. Sm. Rum. Paras. Cont.) for fact sheets and more information.

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Disclaimer

- **Mention of trade names or commercial products is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the U.S. Department of Agriculture. USDA is an equal opportunity provider and employer.**


Goats are easy they said…
Common Health Challenges in Small Ruminants
Katelyn Menacho, DVM
Oak Hammock Large Animal Veterinary Services
Hopefully no one said sheep are easy…

An Accidental Goat Vet

- 2018 University of Florida UF CVM graduate
- Certificate in food animal medicine
- 2019 opened OHLAVS
  - DIY goat vet
  - Peer groups (veterinary specific), text books, podcasts
- 2021 Emergency Leader AASRP
- Today 60% of my practice is small ruminants

"The only way to entirely prevent emergencies is to not own livestock."

Today's Topics

- Parasites
- Sick bottle baby
- Urinary obstruction
- Attack by dog
- Dysotica/reproduction
- General "ADR"
- VCPR
- Resources

Parasites

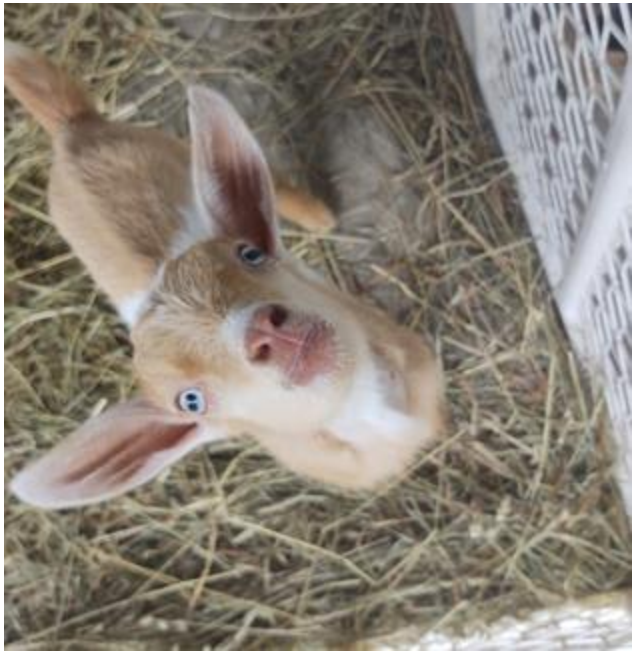
- Do not always see diarrhea
- Hair coat quality can turn poor before a pale FAMACHA sometimes
- Parasites kill quickly - Haemonchus female can lay 10,000 eggs per day

How to prevent ->

- Know your herd, know your parasites
- No two farms get the same deworming protocol
  - History of the farm, owner skill, risk of herd (breeding, CAE/OPP status, etc), stocking density, sand vs grass vs large pasture with mixed forage, willingness to perform fecals
- Postpartum parasite bloom
- Transfer to new home especially with bottle babies
- 20% of the herd sheds 80% of the parasites
- Wormx.info
- FAMACHA Friday

Sick Bottle Baby

- 5 C's - colostrum, calories, consistency, cleanliness & comfort
- Whole milk vs powder
- Do not feed water in a bottle
- Milk does not need to be diluted to wean
- Let them be a goat!
- Clostridium hits hard and fast
- Know history of bottle babies
  - Pulled from doe vs bottle fed
- Always provide fresh clean water
- Some need to be taught to eat hay and grain



Urinary Obstruction

- Castrated males on a high plane of nutrition at higher risk
- Happens in bucks too
- High grain and/or legume hay (peanut, alfalfa*)
- Obesity
- Water or weed component???
- Sometimes very subtle and no obvious straining
- 50:50:50 rule
    - 50% of the time the pizzle amp is successful
    - 50% of the time they are discharged from the hospital
    - 50% of the time they re-block

Attack by Dog

- Nice dogs will bite goats!
- Check integrity of your fences often
- No climb fencing my preference
- Vet intervention often required for appropriate antibiotics, pain medications, flushing
- Polio can easily happen secondary to severe bites

Dystocia/Repro

- Have a kidding box
  - Clean towels, lube, iodine, dog leashes, gloves!
- Watch for 2 kids at once
- Head back is the most difficult
- They can come out with only one leg forward
- Uterine prolapse rare
- Prekidding vagain prolapse more common
- Pregnancy toxemia prevention
  - Nutrition and BCS evaluation
  - Monitor urine ketones +/- blood test (BHB)

ADR - Ain't doing right

- R/O other common things: parasites, urinary obstruction
  - Often times one of these
- Full physical exam and detailed history especially concerning feed changes
- Bluetongue
- Rumen dysbiosis/acidosis
  - Chicken feed
  - Hay change
  - Grass clippings
- Toxicities
  - Azaleas
  - Unknown

VCPR

- What is it? Well that depends
- Why is it important?
  - What is your plan for emergencies?
  - What is your budget?
    - Decide now before the emotions come in
- What a VCPR means for OHLAVS
  - Telemedicine
  - Another set of eyes on the farm
  - Help setting reminders/keeping up with tasks
  - Herd health plans
  - Access to RX medications

Resources

- Podcasts
  - For the Love of Goats
  - Goat Talk with the Goat Doc
  - Wormx.info has podcast links
- Mentorship within goat community
  - Have caution with advice from strangers on the internet
- https://www.facebook.com/oakhammockLAVS
- Raising Goats for Milk and Meat, by Sinn and Rudenberg

Questions

Oak Hammock Large Animal Veterinary Services

M-F 8-4

407-454-1580

Essential Minerals and Vitamins for Small Ruminants

Small Ruminant Short Course

September 19-20, 2024

Diwakar Vyas, PhD
Ruminant Nutritionist
Department of Animal Sciences
University of Florida

I know there is something lacking in the diet. I confirmed last year that my does are very low in their blood Vitamin D2. I have one goat that gets clinical hypocalcemia at kidding each year, and several others that get a little "off". The worst doe nearly died the first 2 years.

MINERAL AND VITAMIN DEFICIENCY

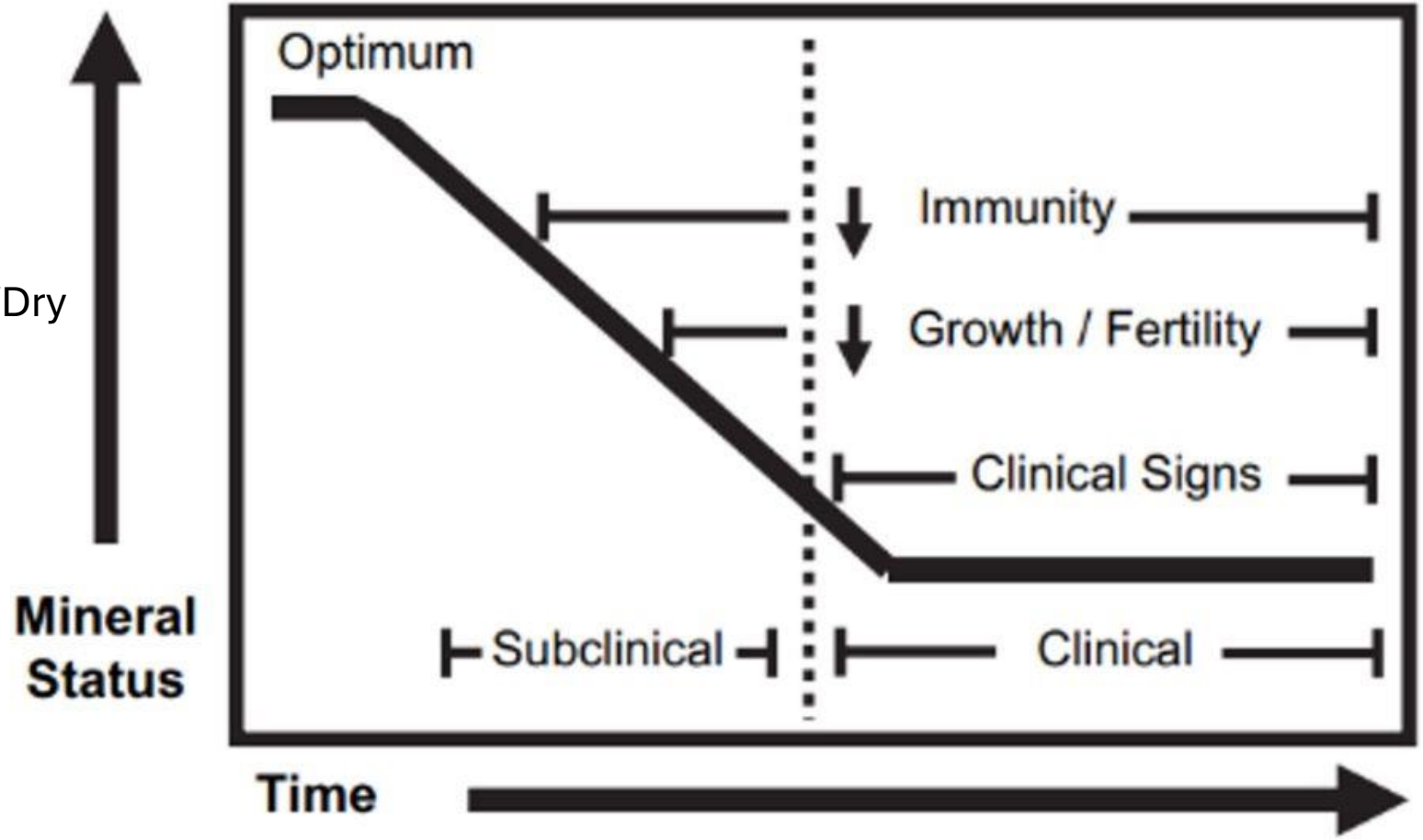
with still born. I have one ewe
g birth to two twins. The last 5
ad the following in common: low
cium levels. The other minerals all

The daily gain on my lambs ar
despite well balanced rations

I am feeding alfalfa hay stored for more than one year. The nutritive values are great but still performance is down.

Mineral status (Clinical vs Subclinical deficiency)

- Decreased weaning weight
- Greater percent ewes open/Dry
- Delayed conception
- Decreased lamb vigor
- Vaccination response
- Colostrum quality



Minerals

Macro Minerals

- Ca
- P
- Mg
- S
- Na
- Cl

0.1-0.7%

Micro Minerals

- Co
- Fe
- Mn
- Se
- Zn
- Mo
- Cu

0.3 to 50 ppm

% grams/d

ppm (mg/kg) mg/d

Vitamins

Fat soluble

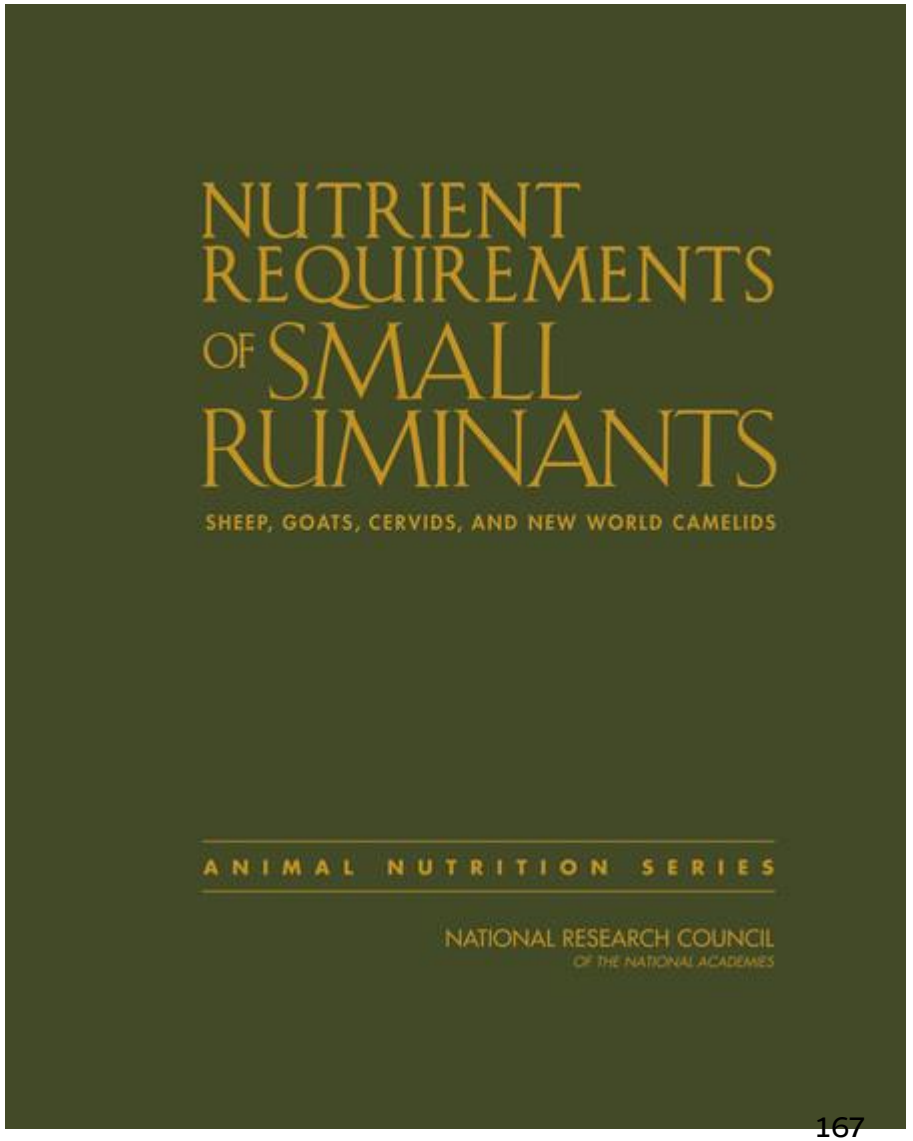
- A
- D
- E
- K

Water soluble

- C
- B complex

IU/kg
IU/lb
IU/day

Nutrient requirements - 2007



Why amounts matter

- **Sheep and goats require specific amounts of minerals**, not just percentages in feed.
- Percentages alone can be misleading – a high percentage in low-feed intake might still provide insufficient minerals.
  - 1% of a mineral in a 1 kg ration = 10g of that mineral
  - But if the sheep only eats 500g of feed, it's getting only 5g – potentially below its requirement.
- Monitor mineral intake

Calcium requirements for mature 130 lb doe

Physiologic state	Calcium, grams (%)
Maintenance	3.0 (0.30)
Late Gestation	6.0 (0.32)
Lactation	
5 lbs /d; 5 % fat	10.8 (0.48)
10 lbs /d; 3.5 % fat	13.1 (0.41)

13.1 grams

Ensuring Adequate Mineral Intake

- To ensure sheep meet their mineral requirements, multiply the feed intake by the percentage of the mineral.
- **Example**: Doe is consuming 1 kg of bermudagrass hay, 0.5 kg grain mix, and 0.5 ounces of mineral mix.

Feed	Daily Feed Intake	% Calcium in Feed	Total Calcium Consumed (g/day)
Bermudagrass hay	1 kg	0.40	4 grams
Grain mix	0.5 kg	1	5 grams
			9 grams

KALMBACH FEEDS
SINCE 1963

2:1 GOAT MINERAL

PRODUCT CODE: 6320

FORM: Meal

APPLICATION:
Formulated to be fed free choice to meat and dairy goats on pasture.

FEATURES and BENEFITS:
- Formulated with chelated trace minerals to maximize absorption and utilization for optimal growth, health and reproduction.
- Maintain healthy hooves to stave off foot rot.
- OPTIFERM to promote better rumen function and fiber utilization.
- Added selenium yeast to promote overall health.
- Added flavors to ensure proper consumption of the mineral.

FEEDING DIRECTIONS:
Feed free choice from sheltered feeders or mix into finished rations for goats to provide ½ to 1 ½ ounces per head per day. Always provide a clean, fresh source of water. Consult your Kalmbach representative concerning any questions with the use of this product.

WARNING: Contains added copper. Do not feed to sheep.

GUARANTEED ANALYSIS:

Calcium (Ca) (Min.)	15.50%
Calcium (Ca) (Max.)	18.50%
Phosphorus (P) (Min.)	8.00%
Salt (NaCl) (Min.)	18.50%
Salt (NaCl) (Max.)	22.00%
Magnesium (Mg) (Min.)	1.50%
Potassium (K) (Min.)	1.00%
Selenium (Se) (Min.)	26 ppm
Copper (Cu) (Min.)	1450 ppm
Copper (Cu) (Max.)	1850 ppm
Zinc (Zn) (Min.)	7500 ppm
Vitamin A (Min.)	300,000 USP/lb.
Vitamin D (Min.)	45,000 IU/Lb.
Vitamin E (Min.)	400 IU/lb.

INGREDIENTS:
Monocalcium Phosphate, Dicalcium Phosphate, Calcium Carbonate, Salt, Molasses, Processed Grain By-Products, Magnesium Oxide, Potassium Chloride, Potassium Sulfate, Active Dry Yeast, Yeast Extract, Magnesium Sulfate, Vegetable Oil, Vitamin A Supplement, Vitamin D Supplement, Vitamin E Supplement, Thiamine Mononitrate, Zinc Sulfate, Iron Oxide, Manganese Sulfate, Copper Sulfate, Ethylenediamine Dihydriodide, Cobalt Sulfate, Zinc Amino Acid Complex, Copper Amino Acid Complex, Manganese Amino Acid Complex, Cobalt Glucoheptonate, Zinc Chloride, Manganese Chloride, Copper Chloride, Selenium Yeast, Sodium Selenite, and Natural and Artificial Flavors.

PRODUCT REFERENCE

905220

- **0.5-1.5 ounces per day**

Calcium calculation

- **15.5 % (minimum)**
- **100 grams will provide 15.5 grams**
- **0.5 ounce (14 grams) will provide Ca = 2.17 grams**

Ensuring Adequate Mineral Intake

- To ensure sheep meet their mineral requirements, multiply the feed intake by the percentage of the mineral.
- **Example**: Doe is consuming 1 kg of bermudagrass hay, 0.5 kg grain mix, and 0.5 ounces of mineral mix.

Feed	Daily Feed Intake	% Ca in Feed	Total Ca Consumed (g/day)
Bermudagrass hay	1 kg	0.40	4 grams
Grain mix	0.5 kg	1	5 grams
Mineral mix	0.5 oz	15.5	2.17 grams

13.1 grams

11.17 grams

Ensuring Adequate Mineral Intake

- To ensure sheep meet their mineral requirements, multiply the feed intake by the percentage of the mineral.
- **Example**: Doe is consuming 1 kg of bermudagrass hay, 0.5 kg grain mix, and 1 ounces of mineral mix.

Feed	Daily Feed Intake	% Ca in Feed	Total Ca Consumed (g/day)
Bermudagrass hay	1 kg	0.40	4 grams
Grain mix	0.5 kg	1	5 grams
Mineral mix	1 oz	15.5	4.34 grams

13.1 grams

13.34 grams

Over-consumption

- Target intake = **1.5 oz/ewe/day**

Example

- 40 ewes
  - 1 bag of mineral (50 lbs each = 800 oz each)
  - 800 oz / (7 days x 40 ewes) = **2.9 oz/ewe/day**
- **Flavoring agents** stimulate intake and often overconsumption
- If ewes eat 10 days worth of mineral in 2 days, don't put out more
- Most minerals stored in liver and very little benefit to consuming more beyond requirement

Test forages

Dairy One

Macrominerals and Microminerals

ROCK RIVER LABORATORY, INC.
AGRICULTURAL ANALYSIS

DAIRYLAND
Laboratories, Inc.

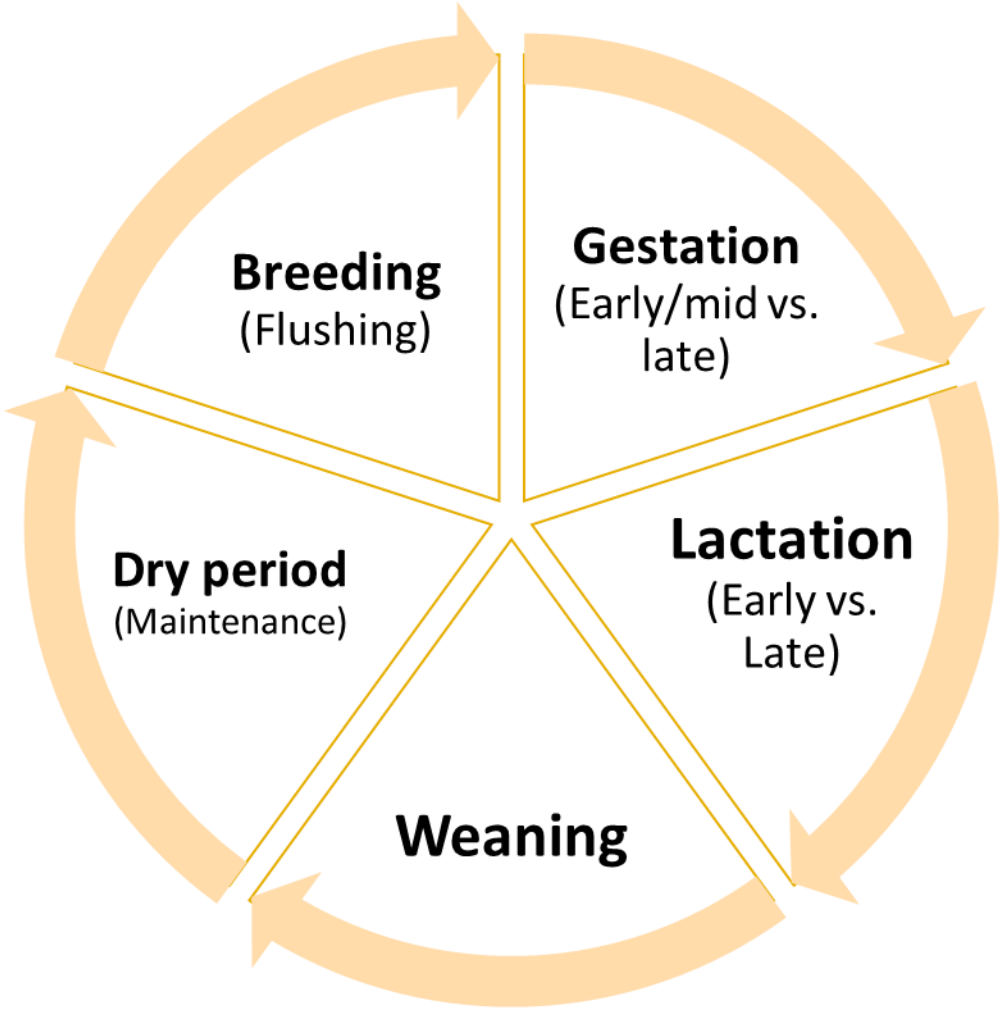
Forage Evaluation Support Laboratory
https://agronomy.ifas.ufl.edu/department-labs/forage-evaluation-support-laboratory/

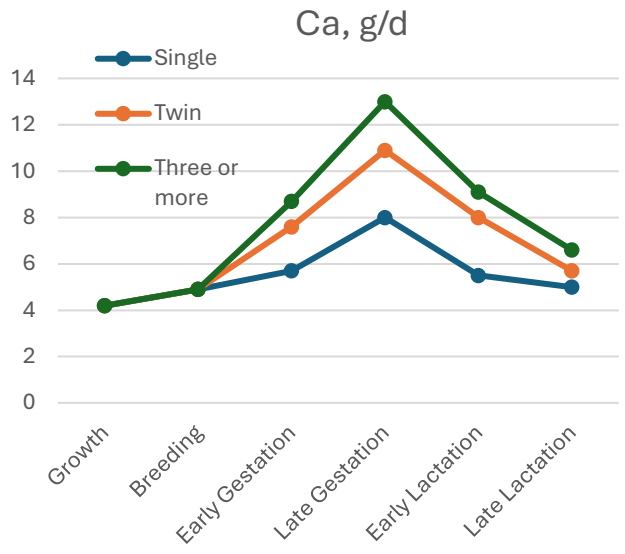
UF AGRONOMY DEPARTMENT

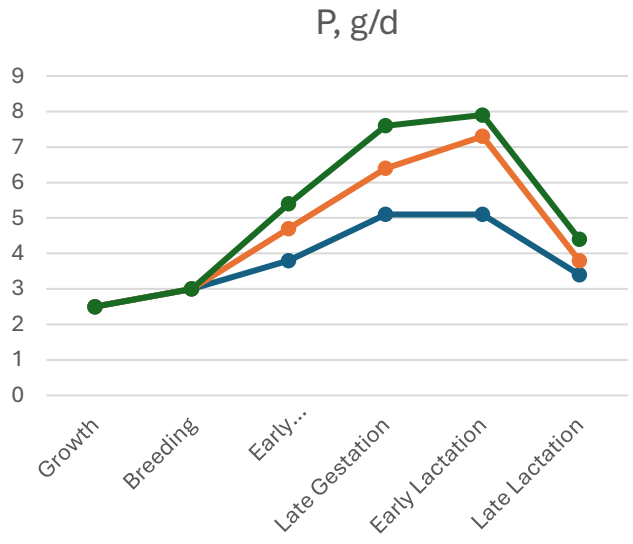
CVAS
CUMBERLAND VALLEY ANALYTICAL SERVICES
" Laboratory services for agriculture ... from the field to the feed bunk "

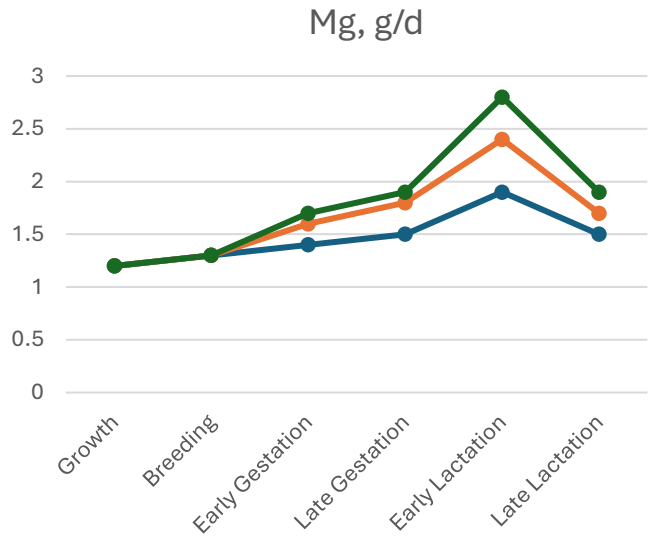
Factors influencing nutrient requirements

- Stage of production
  - Requirements highest during breeding, gestation, and lactation
- Other mineral levels (Mo, Cu, S, Fe)
- Age, and Level of production
  - Requirements increase with age and level of productivity

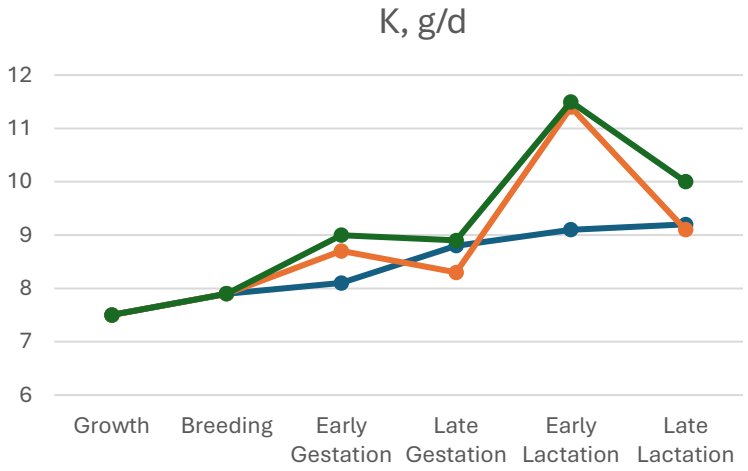


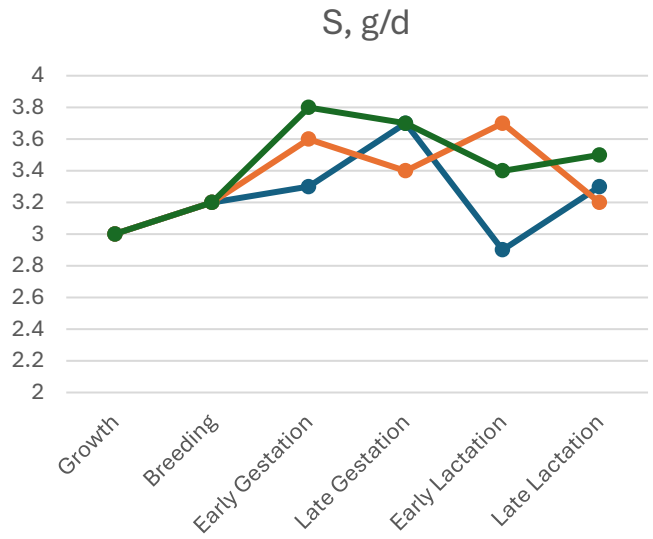


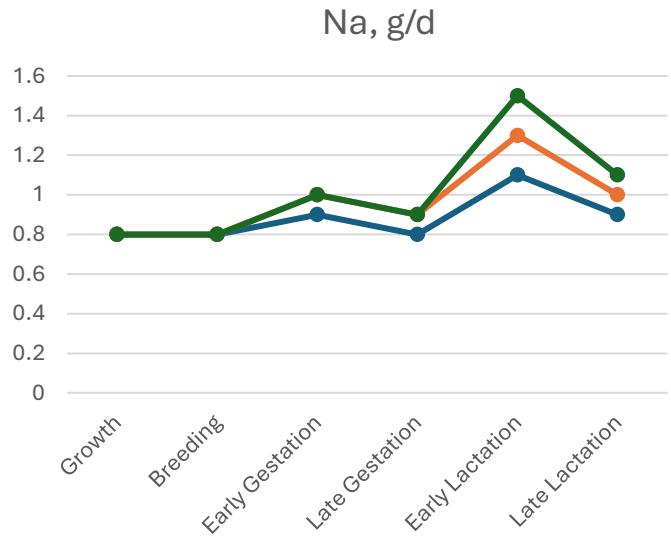


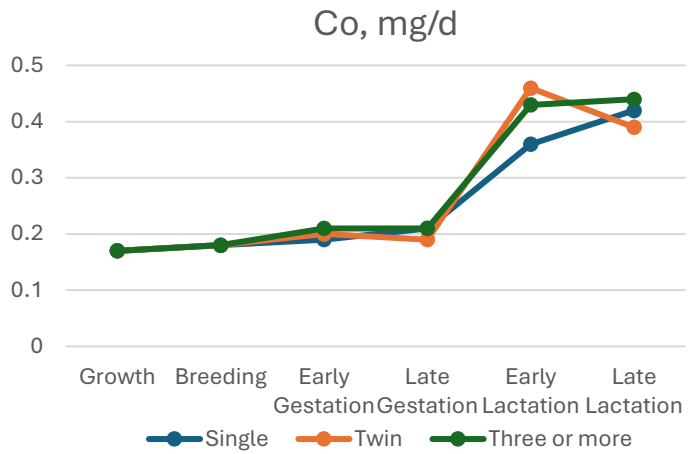


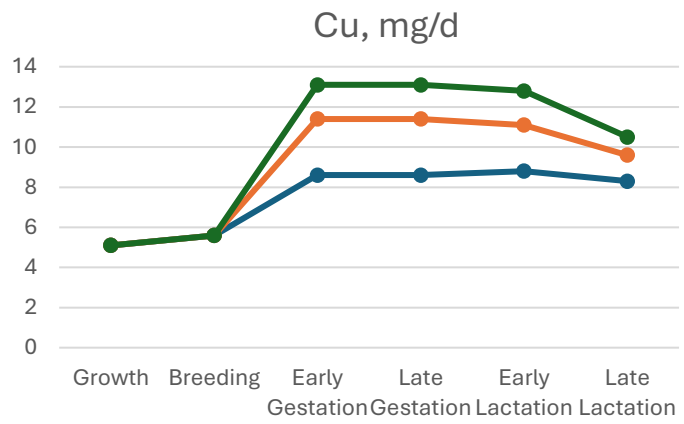
Macromineral requirement, g/d

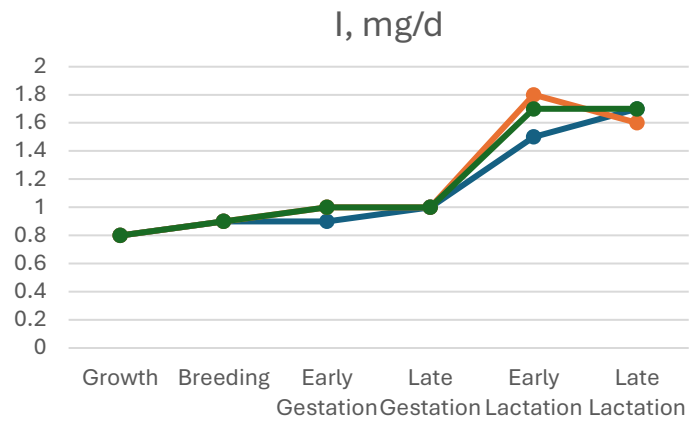


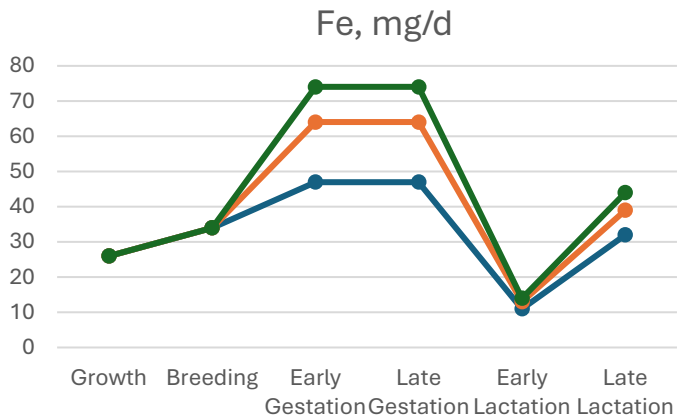


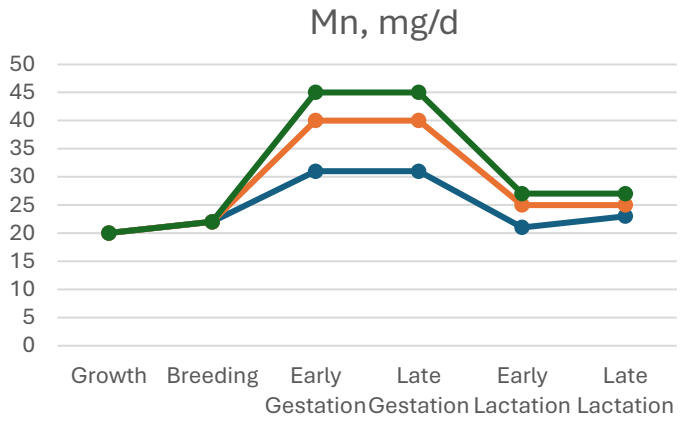


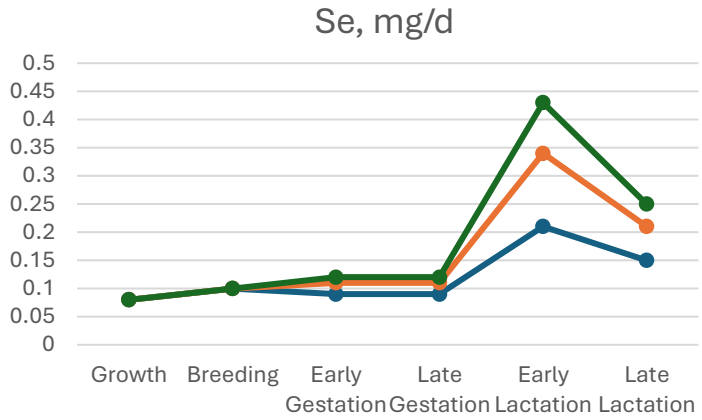


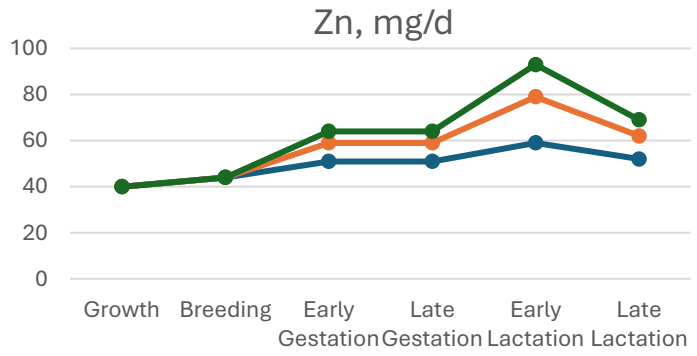






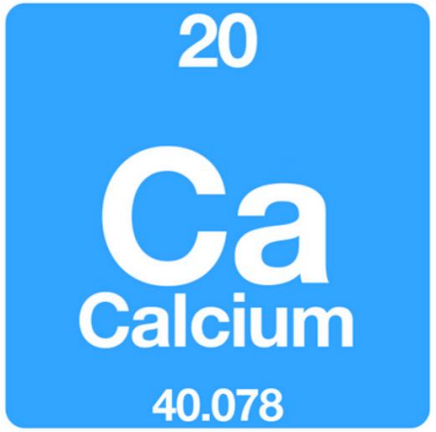




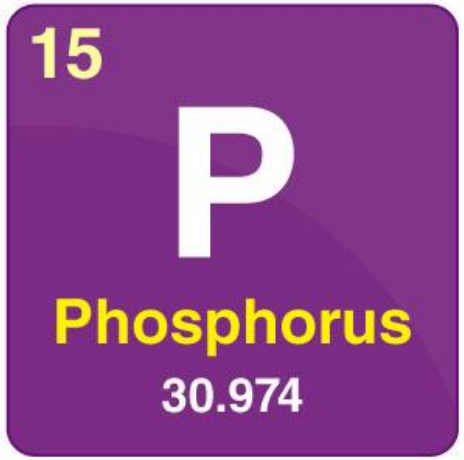


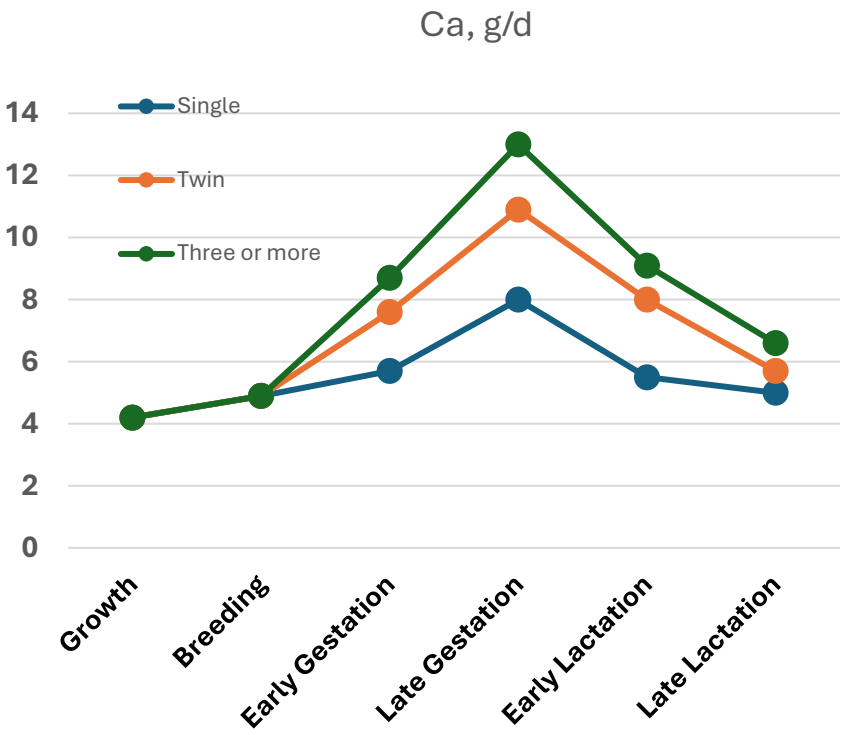
Micromineral requirement, mg/d

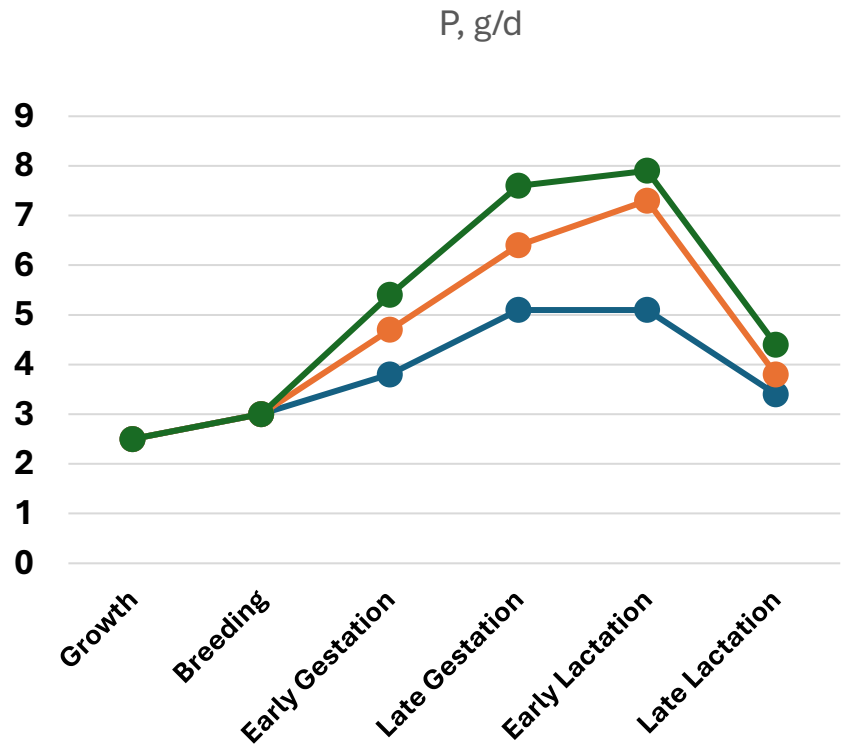
Prioritize supplementation when needs are the highest

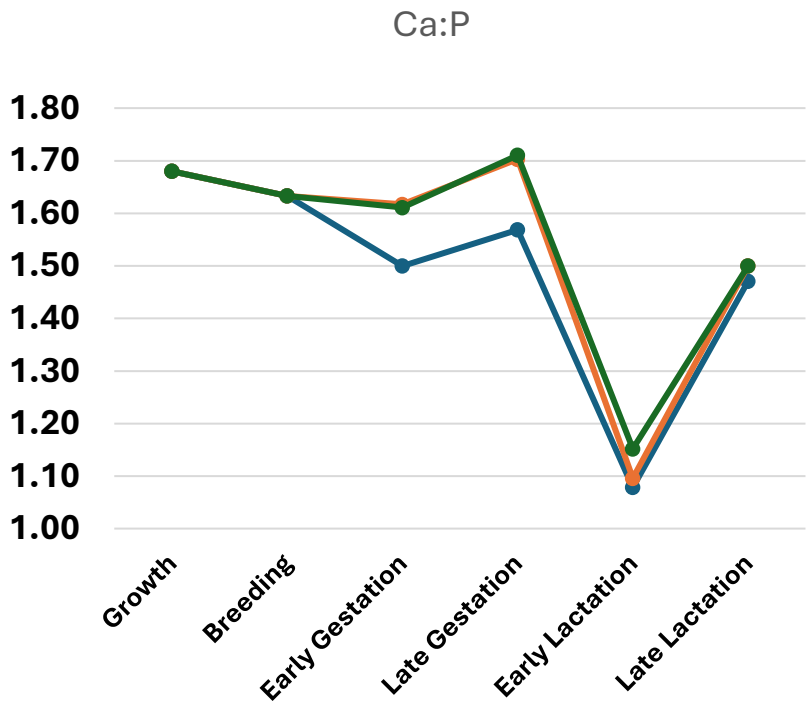


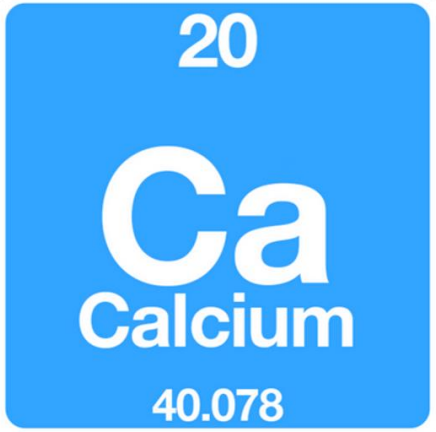
- If fed alfalfa, Calcium not needed.
- Phosphorus not needed with corn.



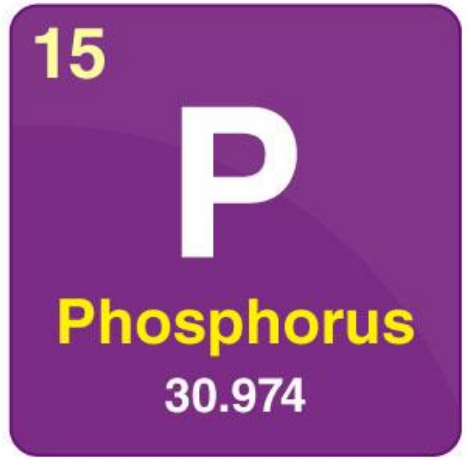






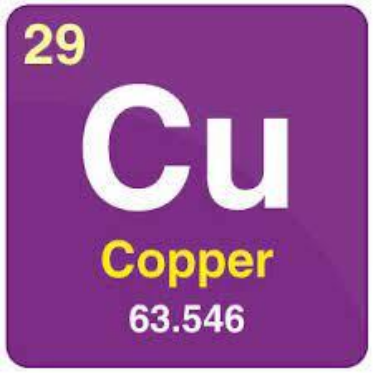


Mineral levels in forages

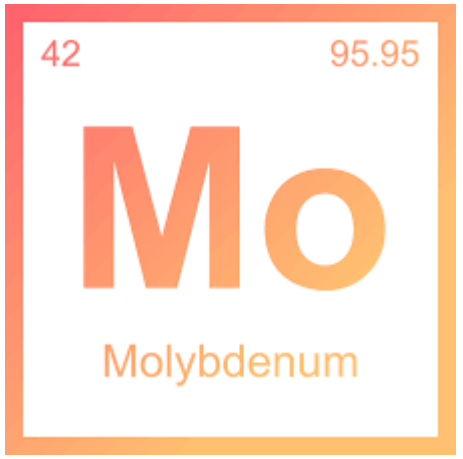


Feed Type	P	K	Ca	Mg	S
Pasture					
Grass	0.38 ± 08	3.38 ± .71	0.43 ± .22	0.22 ± .05	0.32 ± .07
Mixed mostly grass	0.38 ± .08	2.76 ± .71	0.75 ± .22	0.26 ± .05	0.33 ± .07
Mixed mostly legume	0.35 ± .08	2.65 ± .71	1.99 ± .22	0.29 ±0.05	0.30 ± .07
Legume	0.33 ± .08	3.07 ± .71	1.21 ± .22	0.30 ± .05	0.26 ± .07
Hay					
Grass	0.22 ± .06	1.84 ± .57	0.55 ± .21	0.21 ± .06	0.19 ± .09
Mixed mostly grass	0.23 ± .06	1.93 ± .53	0.75 ± .29	0.23 ± .05	0.15 ± .06
Mixed mostly legume	0.25 ± .05	2.26 ± .47	1.14 ± .29	0.26 ± .05	0.18 ± .06
Legume	0.25 ± .05	2.58 ± .51	1.46 ± .29	0.29 ± .06	0.26 ± .07
Silage					
Grass	0.23 ± .08	2.35 ± .86	0.67 ± .26	0.22 ±0.06	0.22 ± .08
Mixed mostly grass	0.28 ± .06	2.29 ± .67	0.87 ± .27	0.23 ± .05	0.20 ± .06
Mixed mostly legume	0.29 ± .05	2.54 ± .59	1.14 ± .25	0.25 ± .05	0.22 ± .06
Legume	0.30 ± .06	2.64 ± .55	1.26 ± .23	0.25 ± .05	0.23 ± .06

Note: Sodium: <0.05 in all forages, Chloride (Legume/Grass forages): 0.5 to 1.0%.
Adapted from Rayburn, 1995.

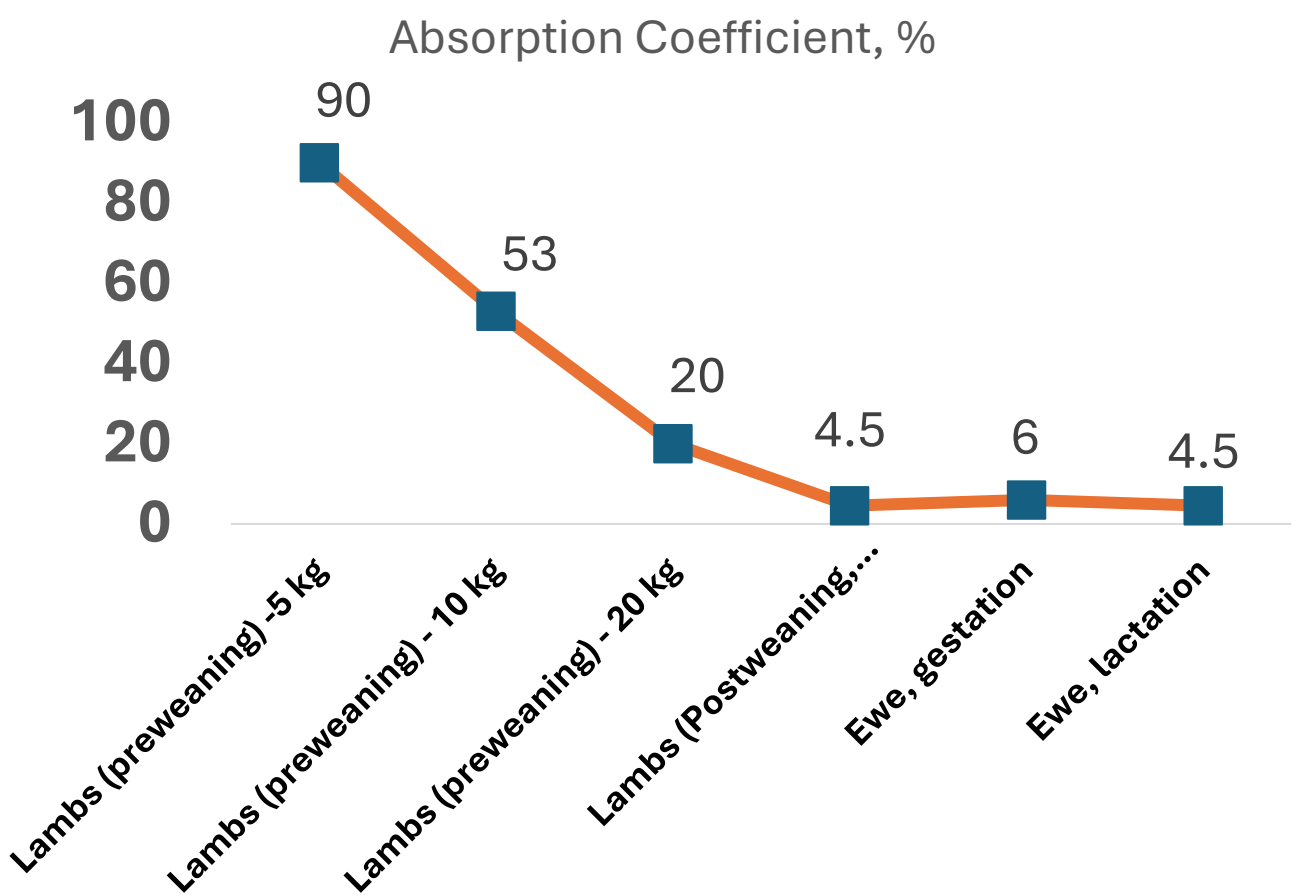


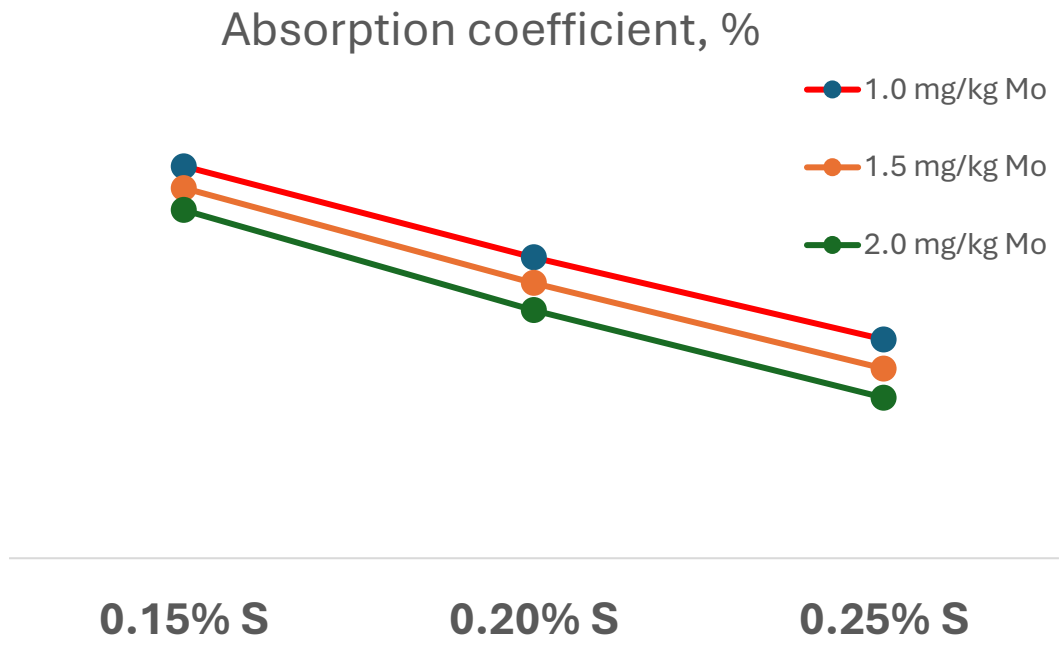
Copper and Molybdenum



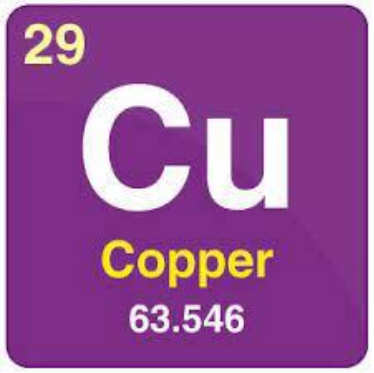
Mineral	Physiological function	Deficiency	Toxicity
Copper and Molybdenum	Enzyme component and catalyst involved in steroidogenesis and prostaglandin synthesis	Delayed and depressed estrus, abortion, death fetuses, infertility, congenital ataxia	Haemolytic crises, haemoglobinuria, haemoglobinaemia, and jaundice; Severe diarrhea, weight loss, anorexia, and reproductive failure

Copper absorption coefficients

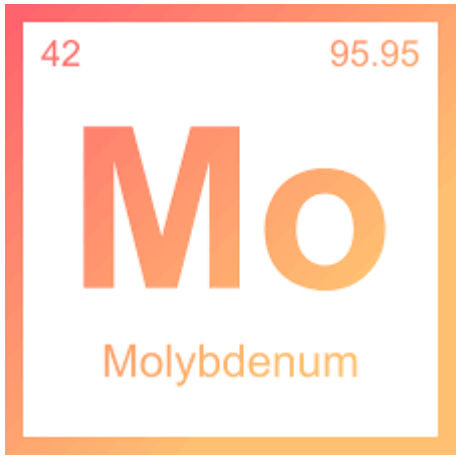




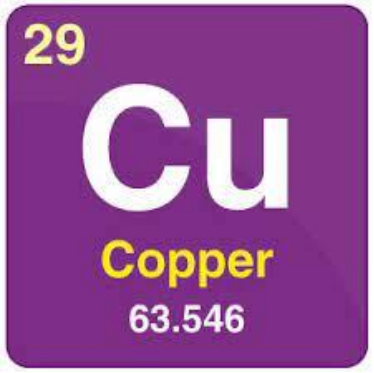
Suttle and McLauchlin, 1976



Sheep



- **Copper requirements (Sheep):** 7-11 mg/kg DM
  - Ratio between Cu and Mo should be around 4:1
- **Maximum tolerable levels (Sheep):** 15 mg/kg DM
  - Mo concentration: 1-2 mg/kg
  - S concentration: 0.15-0.25%
- **Molybdenum requirements (Sheep):** 0.5 mg/kg DM



Copper toxicity

FEED

•Do not give sheep feed that is specially formulated for cattle, swine, or poultry

•Have feed tested for copper and other minerals

•Cu:Mo ratio between 4-1 up to 10-1

FORAGE

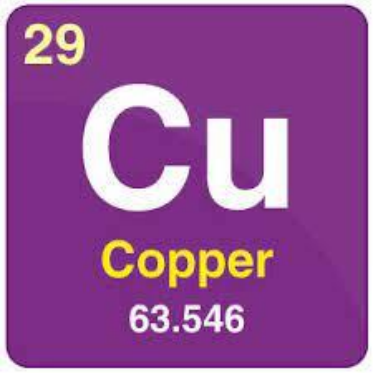
•Forage test for molybdenum, sulfur, and iron levels

•No grazing on pastures containing swine/poultry waste

•No algae/snail/pest control products with copper

EQUIPMENT

•Clean feed and water equipment thoroughly before use, especially if equipment has previously been used to feed other species with higher copper tolerances



Goats

Copper requirements (Goats):

- **Lactating:** 15 mg/kg DM
- **Bucks:** 20 mg/kg DM
- **Growing:** 25 mg/kg DM

Maximum tolerable levels (Goats):

- Not established
- Cautious approach (40 mg/kg)

- **Molybdenum requirements (Goats):** 0.1 to 1 mg/kg DM

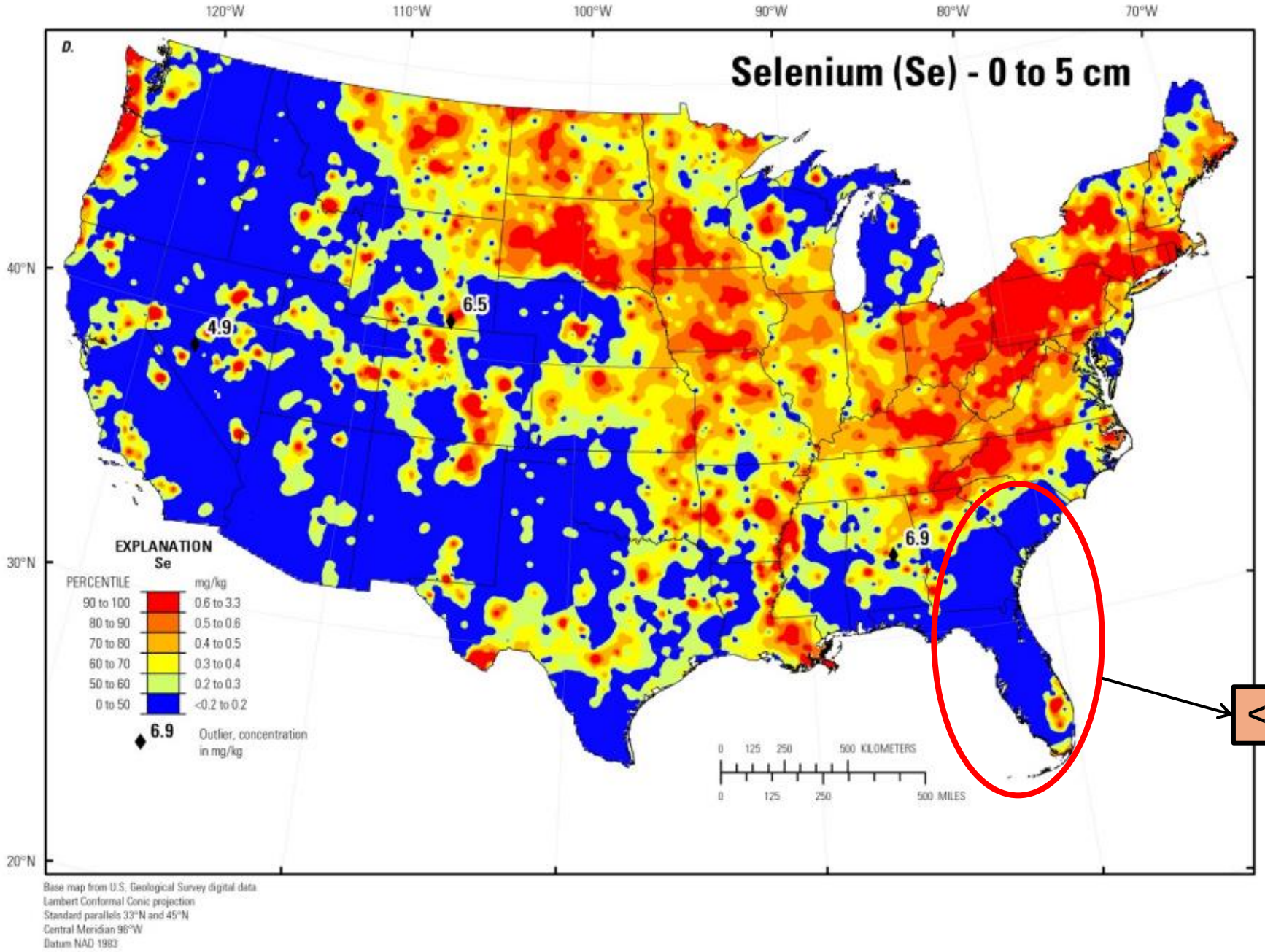
Goats | Farm Animals - Farm Sanctuary

34

Se

Selenium

78.971



- USGS Scientific Investigations Report 2017-5118: Geochemical and Mineralogical Maps, with Interpretation, for Soils of the Conterminous United States

Selenium deficiency

- Pastures grown on selenium-deficient soils (such as acid soils receiving more than 410 mm annual rainfall)
- Lush, rapidly growing pasture
- Legume-dominant pasture
- Paddocks that have received heavy or long-term sulphur-containing or superphosphate fertilizer applications.

Kappel et al., 1985

Forages	Number of samples	Selenium (mg/kg)
Corn silage	19	0.05
Sorghum silage	21	0.06
Bermudagrass	27	0.16
Bahiagrass	41	0.09
Oats and Ryegrass	31	0.08

- Because of toxicity concerns, Se intake is controlled at **0.69 mg intake per day** or **0.30 mg/kg DM**.
- Overdose of Selenium **(5-15 mg)** can be lethal to lambs
- Mineral mixes cannot have more than **90 ppm (mg/kg) Se** and commercial products ranges from **10-90 ppm**

Selenium

Se (Premix, mg/kg)	Intake (grams) of premix to meet requirements (0.69 mg/day)	Intake (oz.) of premix to meet requirements (0.69 mg/day)
10	69	2.4
50	14	0.50
90	8	0.27

A premix with Se concentration of 10 ppm would need sheep to consume 2.4 ounces (69 grams) daily to meet requirement which is difficult to consume. A higher Se concentration premix, such as 50 or 90 ppm, would be more appropriate for adequate intake.

Trace mineral salt (reading labels)

Guaranteed Analysis

		%	PPM
salt	min	94.0	940,000
salt	max	99.0	990,000
sodium	min	37.00	370,000
sodium	max	39.98	399,800
selenium	min	0.007	70
selenium	max	0.009	90

		%	PPM
zinc	min	0.350	3,500
iron	min	0.200	2,000
managanese	min	0.200	2,000
cobalt	min	0.005	50
iodine	min	0.007	70

Ingredients

Salt, Zinc Oxide, Iron Carbonate, Calcium Carbonate, Manganous Oxide, Red Iron Oxide, Mineral Oil, Sodium Selenite, Calcium Iodate, Cobalt Carbonate, and Anise Flavor.

Guaranteed Analysis

Calcium (Ca), minimum 3.5%
Calcium (Ca), maximum 5.5%
Sulfur (S), minimum 11.00%
Cobalt (Co), minimum ..... 600 ppm
Selenium (Se), minimum ..... 990 ppm
Iron (Fe), minimum ..... 1,000 ppm
Iodine (I), minimum ..... 6,000 ppm
Manganese (Mn), minimum ..... 16,000 ppm
Copper (Cu), minimum ..... 50,000 ppm
Copper (Cu), maximum ..... 55,000 ppm
Zinc (Zn), minimum ..... 245,000 ppm

Ingredients

Zinc Sulfate, Copper Sulfate, Zinc Oxide, Manganese Sulfate, Mineral Oil, Calcium Carbonate, Manganous Oxide, Ethylenediamine Dihydriodide, Sodium Selenite, Ferrous Sulfate, Cobalt Carbonate.

GUARANTEED ANALYSIS

CHEMICAL ANALYSIS	AVERAGE	MAX	MIN
Sodium Chloride	90% - 95%	96%	91%
Calcium	0.35% - 0.55%	0.85%	0.35%
Copper			3 ppm
Iodine	12 ppm		10 ppm
Iron	500 ppm		300 ppm
Magnesium	0.09%		0.06%
Manganese			5 ppm
Phosphorus			0.02%
Potassium			0.03%
Sulfur	0.2%		0.07%
Zinc			1 ppm

TYPICAL - NOT GUARANTEED

MINERAL	PPM	MINERAL	PPM	MINERAL	PPM
Aluminum	215	Gadolinium	.61	Selenium	0.23
Antimony	1.08	Gallium	2.36	Silicon	3000
Arsenic	<0.02	Germanium	.27	Silver	.29
Barium	9.95	Indium	.37	Strontium	11.9
Bismuth	0.38	Lanthanum	0.08	Tantalum	.97
Boron	1.07	Lead	0.06	Tellurium	0.17
Bromine	10.51	Lithium	0.74	Thallium	.09
Cadmium	<0.05	Lutetium	.07	Thorium	0.19
Carbon	204	Molybenum	0.08	Thulium	.07
Cerium	.76	Nickel	.07	Tin	.12
Cesium	.33	Niobium	0.11	Titanium	0.93
Chromium	0.16	Praseodymium	.11	Tungsten	.11
Cobalt	0.08	Rubidium	3.77	Vanadium	.18
Dysporsium	.21	Ruthenium	.07	Yitterbium	.07
Erbium	1.34	Samarium	1.44	Yttrium	0.04
Fluoride	10.6	Scandium	.18	Zirconium	2.95

Mineral sources

- Mineral availability - how easily the body can absorb and use minerals from the mineral sources

Form	Absorption
Oxides	Low (20-40%)
Sulfates	Medium (40-60%)
Chelates	High (50-70%)

Vitamins

Fat soluble

- **A**
- **D**
- **E**

Usually adequate in diets containing high quality forages. Sometimes, supplementation is required

- **K** Synthesized in rumen

Water soluble

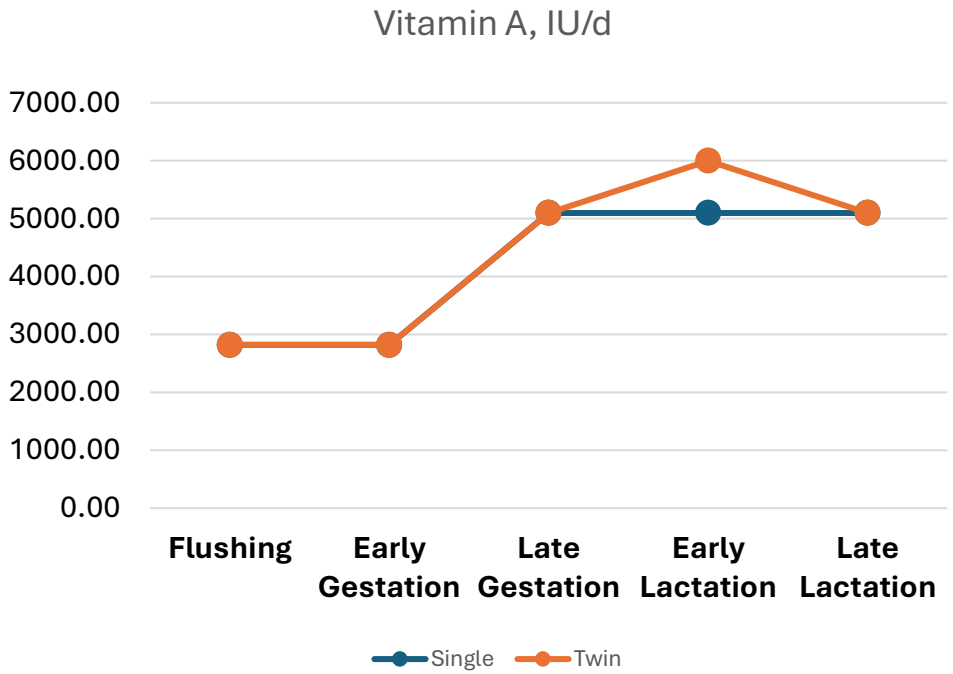
- **C** Synthesized in tissues
- **B complex**
  - **Thiamine (B1)**
  - **B12**
  - **Others**

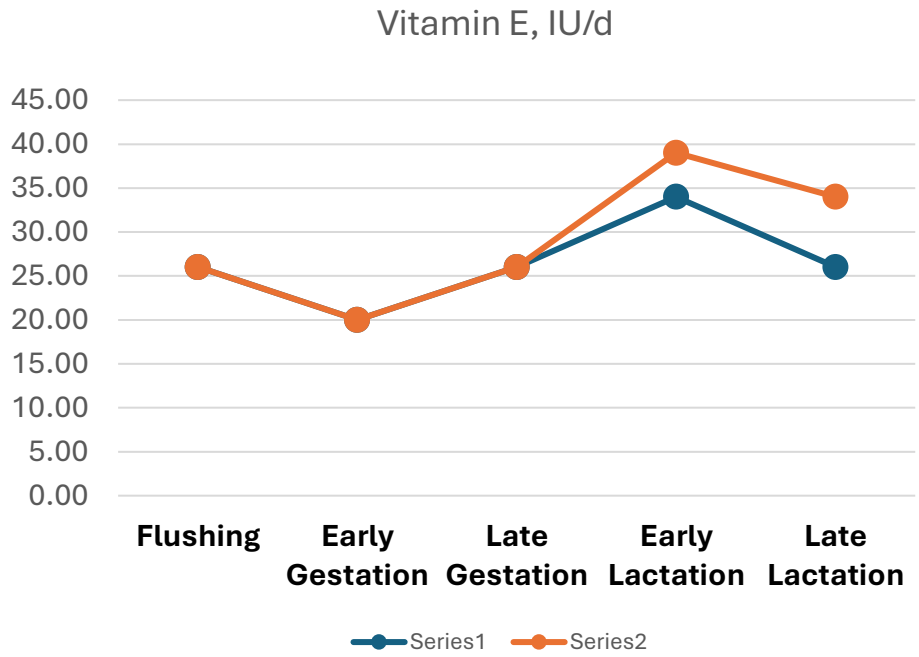
Synthesized in rumen
No dietary requirement

Vitamins

Table 1. Minerals and Vitamins in Forage and Required by Sheep				
		Class of Sheep and Their Requirements (in diet Dry Matter)		
		Mature Ewe		**Young Lamb**
Nutrient	Good Forage	Early Pregnancy	Nursing Twins	Fast Gain
Vit A, IU/lb DM	50,000	1000	1200	500
Vit D, IU/lb DM	500	100	100	100
Vit E, IU/lb DM	10	7	7	7

Vitamin requirements





Vitamins

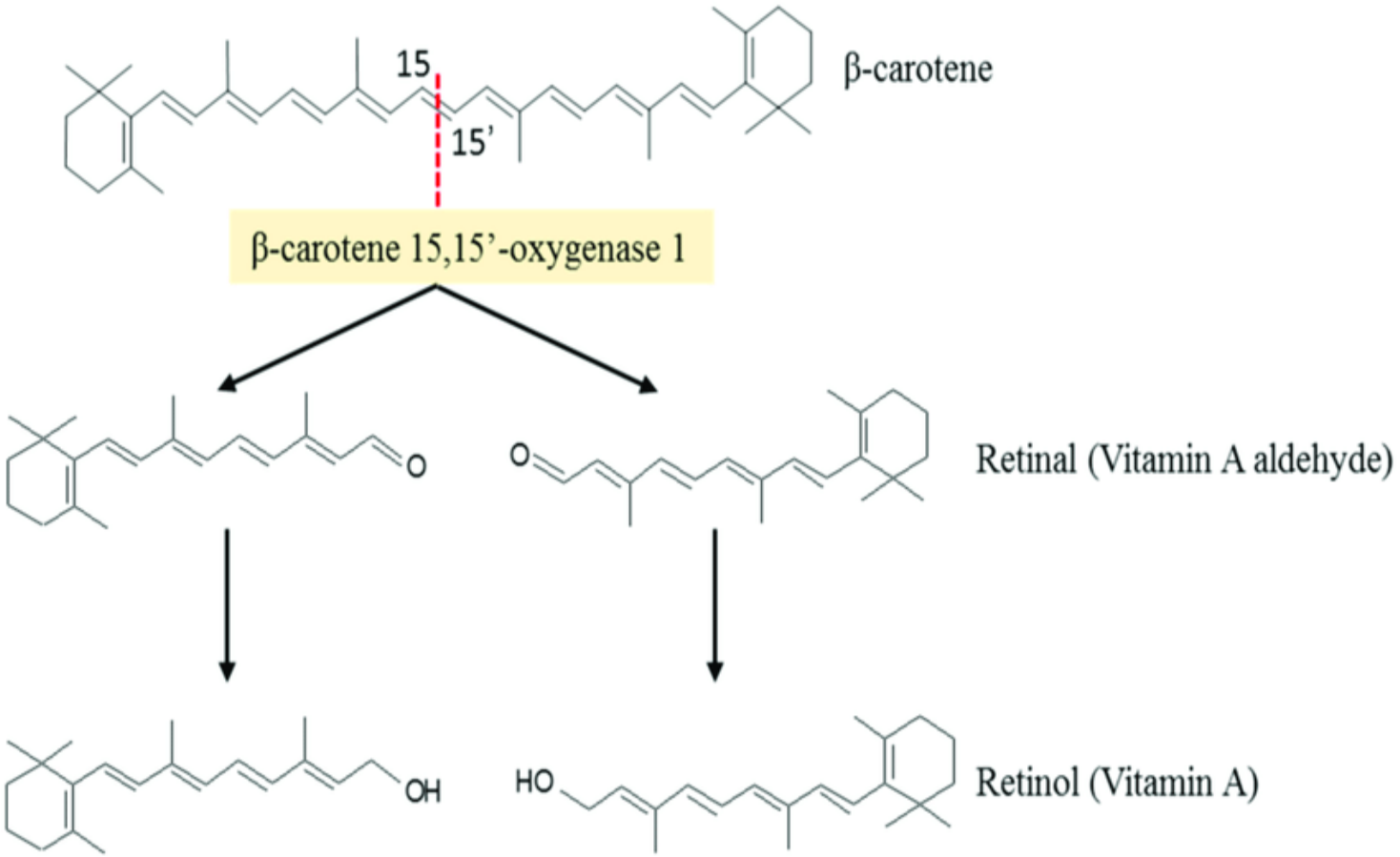
- Vitamins are inactivated during storage
- Half life is 30 days
- On farm Vitamin fortification
  - 50 ewes free choice mineral with ½ ounce intake
  - If needed, supplement ADE premix
  - Ewes need 3500 IU of Vitamin A and 150-300 IU Vitamin E daily

Example

Feeding directions: 1 ounce per day (28 grams or 0.0625 lbs daily)

Nutrient Name	Min Max Indicator	Nutrient Amount	
Ash	Max	90%	
Calcium	Min	15.75%	
Calcium	Max	18.90%	
Phosphorus	Min	8%	
Salt	Min	16.20%	
Salt	Max	19.44%	
Sodium	Max	7.80%	
Magnesium	Min	0.75%	
Potassium	Min	0.10%	
Manganese	Min	2500 PPM	
Cobalt	Min	10 PPM	
Iodine	Min	90 PPM	
Selenium	Min	24.5 PPM	
Selenium	Max	29.4 PPM	
Zinc	Min	4000 PPM	
Vitamin A	Min	300000 IU/LB	**18,750 IU**
Vitamin D3	Min	30000 IU/LB	**1,875 IU**
Vitamin E	Min	2000 IU/LB	**125 IU**

Vitamin A



Grazing pastures (Bahiagrass, Bermudagrass)

↓

β-Carotene ~40 ug/g DM

↓

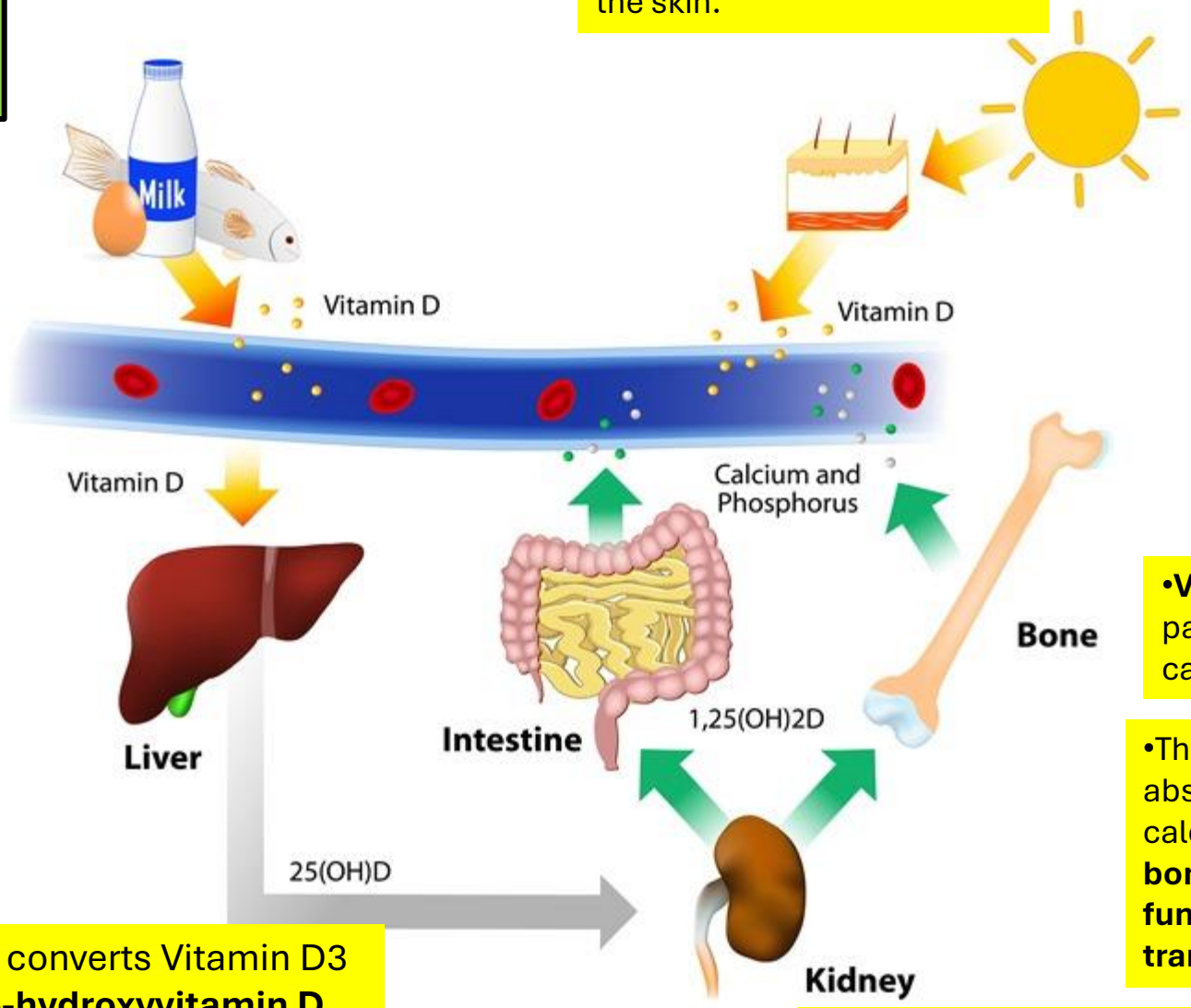
670 IU Vitamin A synthesized per mg β-Carotene

Vitamin E

- Feed ewes or nannies > 100 IU/head/days
  - Late gestation and lactation
- Creep feed minimum 60,000 IU/ton
  - Up to 100,000 IU/ton
- Do not count on Vitamin E in mineral
  - Concentration is very low
- Grazing on green grass – no problem because of high levels

Vitamin D and Calcium absorption

Sunlight triggers the production of **Vitamin D3** in the skin.



Liver converts Vitamin D3 to **25-hydroxyvitamin D**.

•**Vitamin D** also interacts with the parathyroid hormone to pull calcium from bones if necessary.

•This boosts calcium absorption, making dietary calcium more available for **bone health**, **muscle function**, and **nerve transmission**.

•The kidneys further convert it to the active form, **1,25-dihydroxyvitamin D (calcitriol)**.

Vitamin D levels

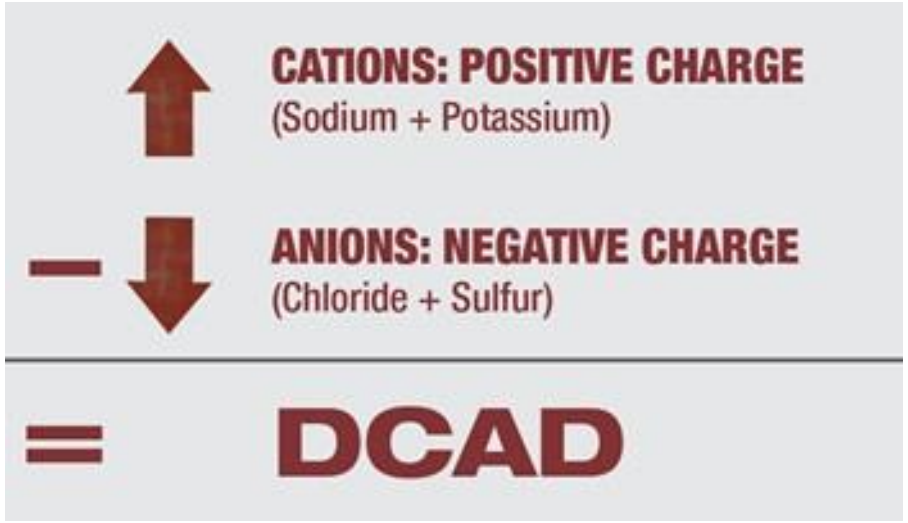
- 25-hydroxyvitamin D2: **2.8 ng/ml**
- 25-hydroxyvitamin D3: **14.5 ng/ml (75 ng/ml)**

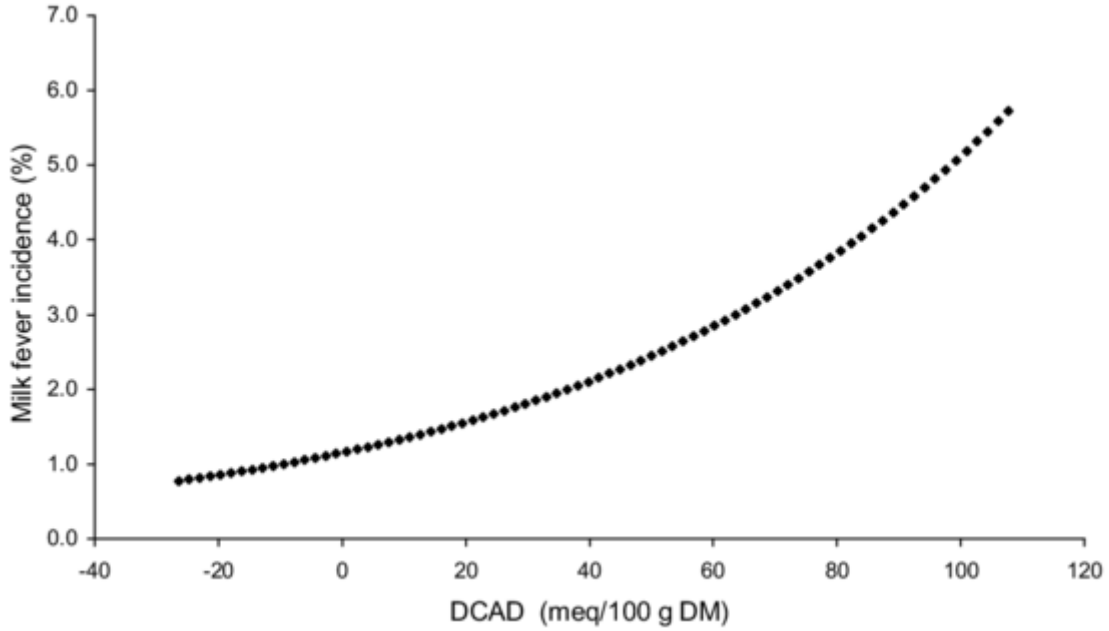
Suffers from lactational clinical hypocalcemia

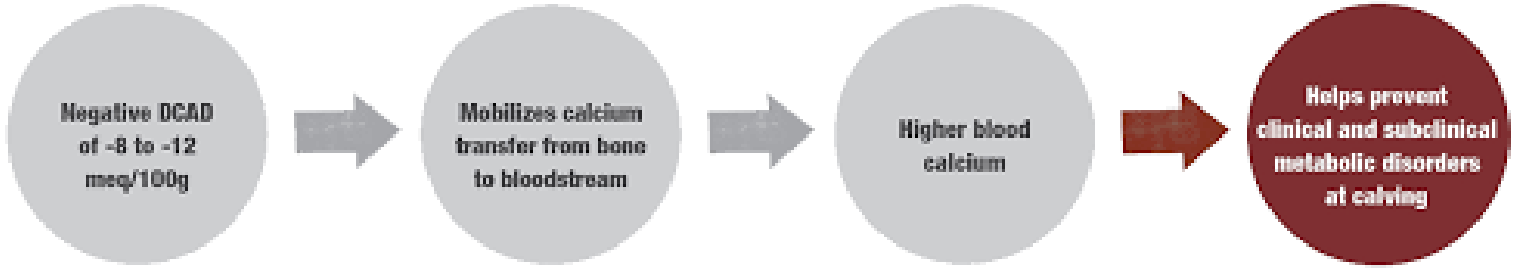
The low Vitamin D2 reflects the quality of the forage perhaps this is aged forage that has been stored for a while and not well sun-cured.

- 25-hydroxyvitamin D2: **4.6 ng/ml**
- 25-hydroxyvitamin D3: **39.0 ng/ml**

Dietary Cation-Anion difference







Take-home

- Sample forages and feeds
  - Trace mineral analysis are around $40 per sample
  - If feed ingredients are purchased, even more important to test
  - Pasture mineral composition will change withing season and from year to year
- Monitor mineral intake
  - Add to grain mix
  - Read mineral tag and avoid over-consumption
  - Needed year round
- Prioritize mineral and vitamin program during breeding, gestation, lactation and pre-weaning

Thanks

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2024 University of Florida Ram & Buck Test Data Overview

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UF IFAS | UF ANIMAL SCIENCES | UF College of Veterinary Medicine | UF IFAS Extension | UF IFAS | SMALL RUMINANT PROGRAM

Management

- Rams and bucks were received on May 18, 2024
  - Eligible rams mush be born between 12/1/23 and 2/15/24
  - Eligible bucks must be born between 12/15/23 and 3/1/24
  - Upon arrival, administered three anthelmintics: Cydectin, Fenbendazole, Levamisole
  - Initial data parameters were recorded
- Fecal Egg Count Reduction Test (FECRT) on 10-14 days later
  - Individuals with fecal egg count (FEC) > 500 epg were dismissed from the program due to anthelmintic resistant parasites
- 84-day test period
  - 34 rams participated in the entire test period
  - 39 bucks participated in the entire test period

Nutrition

- Bahiagrass pastures
  - Continuous access
  - Pasture remained > 5 inches in height
  - Pasture rotation every 14-21 days
- Purina SE FL small ruminant ration (16% CP)
  - Rams fed at a target consumption of 2% BW
  - Bucks fed at a target consumption of 1-2% BW
- Purina free choice mineral available at all times
- 25-30 inches of rainfall this year during test period

Data Collection

- Collected every 14 days throughout the test period:
  - Body weight (BW)
  - Body condition score (BCS)
  - FAMACHA score
  - Fecal egg count (FEC)

- Collected at test start, mid-point, and final data collection:
  - Scrotal circumference (SC)

FEC Management Parameters

- Any **ram** with a fecal egg count above 3,000 epg will indicate a threshold for deworming.
- Any **buck** with a fecal egg count above 2,500 epg will indicate a threshold for deworming.
- The ram/buck will be allowed the opportunity to mount an immune response (14-days).
- If the ram's FEC is >3,000 epg or buck's FEC is >2,500 epg at a given collection interval and the FEC remains at the following collection interval (14-days later), this will result in deworming.
- A FAMACHA score of >4 and BCS <1.5 also indicates deworming will be performed.
- **Disqualification from ram/buck test sale eligibility occurs after one deworming during the test period.**

Performance Data

- Final weight (CW)
  - Weight at the conclusion of the 84-day gain test
- Test ADG
  - Average daily gain in pounds per day for the entire 84-day test period
- Final WDA
  - Weight-per-day-of-age at the conclusion of the test period
  - Calculated by dividing the final weight by days of age
  - Indicative of the individual's growth since birth and includes growth prior to arriving at the test

Performance Data

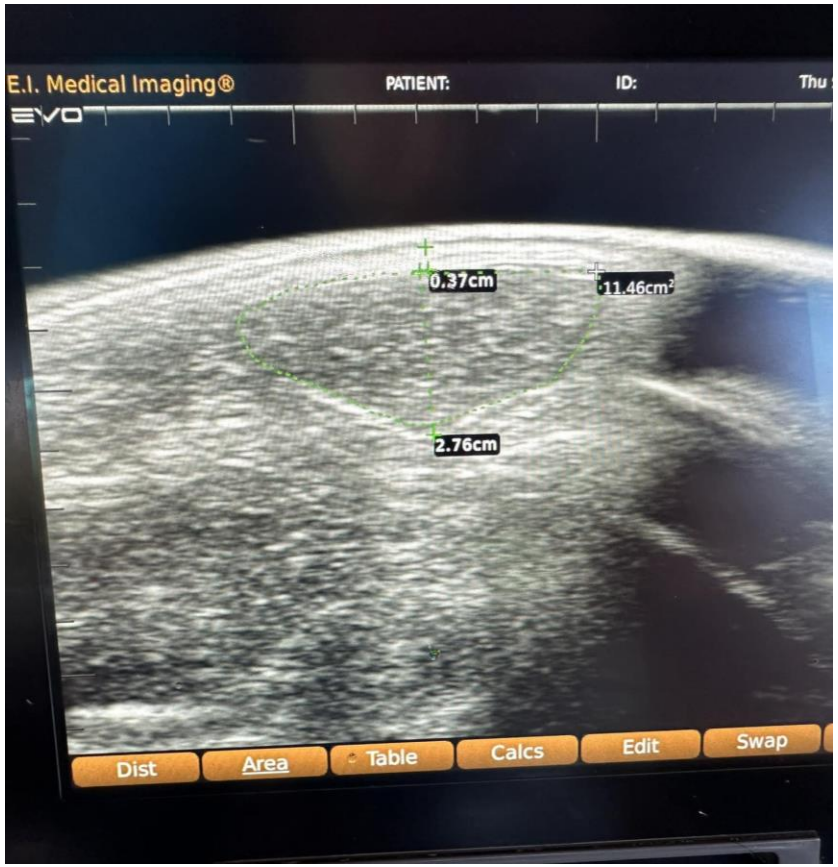
- ADG Ratio
  - Expresses an individual's ADG as a percentage of the average ADG for the entire test group
- WDA Ratio
  - Expresses and individual's WDA as a percentage of the average WDA for the entire test group
- Growth Index Ratio
  - Expresses ADG ratio and WDA ratio for an individual as a percentage of the average performance of all individuals on test
  - Considers both pre-weaning and post-weaning growth
- **Ratio of 100 is average, 110 is 10% above average, and 90 is 10% below average**

Performance Data

- Average FEC
  - Average fecal egg count in eggs per gram for the entire 84-day test period
- FEC Ratio
  - Expresses FEC for an individual as a percentage of the average performance of all individuals
  - Ratio of 100 is average, 110 is 10% above average, and 90 is 10% below average
- Codon 171 genotype associated with resistance to scrapie
  - Presence of at least one *R* is associated with resistance

Performance Data

- LMA – Longissimus Muscle Area
  - The measure of the total area of the loin or ribeye (longissimus dorsi muscle) between the 12th and 13th rib (in cm^2)
  - *Data adjusted to 125 lbs body weight*
- BF – Backfat Thickness
  - External fat thickness (back fat) is quantified at the 12-13th rib and measured directly over the ribeye muscle (in cm)
  - *Data adjusted to 125 lbs body weight*
- LED – Loin Eye Depth
  - The depth of the eye muscle or loin is measured between the 12th and 13th ribs (in cm)



Sale Qualification

- Overall index **greater than 90** for BOTH:
  - Fecal Egg Count ratio
  - Growth Index
    - Expresses WDA and ADG ratios
- All individuals being sold were **NOT** dewormed on test

Sale Qualification

- Achieve 'Satisfactory' Breeding Soundness Evaluation
  - Performed by UFCVM licensed veterinarians within <30 days of the sale

Sale Lot Order

- Sale order will be determined by test performance with those individuals who performed the best, highest FEC Ratio and Growth Index, will sell first

- Sale order will be determined in descending order beginning with the highest ratioing animal for the combined traits of Fecal Egg Count and Growth Index.
  - In the event of a tie, the tie will be broken by the Fecal Egg Count ratio

Willoughby Livestock Sales

- Our sale format is online.
- Sale is open for 24 hours, **beginning September 20 at 11 AM and closing September 21 at 11 AM EST**.
- Ram Test Sale
  - https://www.wlivestock.com/auction/25929
- Buck Test Sale
  - Unfortunately, we will not be holding a UF Buck Test Sale this year. Of the bucks that made sale eligibility, the consignors have elected to retain their genetics.

WILLOUGHBY SALES

Acknowledgements

- UF Ram & Buck Test Committee
  - UF IFAS Animal Sciences faculty & staff
    - Dr. John Arthington
    - Dr. Diwakar Vyas
    - Dr. Chad Carr
    - Audy Spell
    - Clay Whitehead
    - Jack Eck
    - Matti Moyer
    - Savannah Linzmaier
- UF College of Veterinary Medicine faculty
  - Dr. Brittany Diehl
- UF Ram Test Producer Steering Committee
  - Roxanne Newton
  - Louise Hall
  - Ruth Taber
  - Carol Postley
- UF Buck Test Producer Steering Committee
  - Joe Knetter
  - William Chapman
  - Jeff Lamote
  - Jimmy Carroll

Acknowledgements

- **Ram Test Consigning Producers**
  - Hanako Farm/Kim & Dennis Negoro – Oviedo, FL
  - James Evensen – Bunnell, FL
  - University of Florida – Gainesville, FL
  - Fairmeadow Farms/Carol Postley – Ocala, FL
  - Hound River Katahdins/Roxanne & Milledge Newton – Hahira, GA
  - T8 Farms/Kenneth Harrison – Bell, FL
  - Marbled Duck Ranch – Millen, GA
  - Pedro Pablo Velez – Sebring, FL
  - Yellow Hill Ranch/Leo Borges – Hawthorne, FL
  - Leonard & Linda Freeman – Palatka, FL
  - Sandra Foster – Newberry, FL
  - Windlestone Ranch/Louise Hall – Brooksville, FL
  - Calovine Farm/Ruth Taber – Williston, FL

Acknowledgements

- **Buck Test Consigning Producers**
  - Chapman Kikos/William Chapman – Chatsworth, GA
  - MacTavish Farmstead/James E. Thompson – Bethlehem, GA
  - Kelley Kikos/Richard Kelley – Brooksville, FL
  - Wistlin' Dixie Kikos/Joe Knetter – Vinemont, AL
  - Trey Mishoe – Swansea, SC
  - Wildflower Acres Farm/Susan Manning – Lee, FL
  - Ashfield Farm Kikos/James & Ashley Mansfield – Wellborn, FL
  - Jimmy Carroll – Callahan, FL
  - Double P Farms/John & Amanda Pope – Leakesville, MS
  - A Triple J Rance/Jeff Lamote – Cullman, AL
  - Grace Farms/Alecia Fordham – Woodland, AL
  - Mountain Top Farm/Colton Pritchett – Union Grove, AL
  - Blessed Acres Kiko Farm/Christina & Jason Morris – Crofton, KY
  - Stoney Creek Kikos/Bill & Kisa Francis – Okmulgee, OK
  - S&R Triple Bar Kikos/Jim Stewart – Madison, FL
  - Hubbard Hill Kikos/Justin Gibson – Ponca City, OK
  - Square One Kikos/Mike & Jessie Brust – Redfield, AR
  - Glasson Kikos/James Tyler & Sydney Glasson – Irvine, KY
  - Triple M Kikos/Christian & Ron McGill – Cicero, IN
  - Rice Livestock/Ethan Rice – Burlington, KS

Acknowledgements

- UF IFAS Extension Agents
- UF IFAS Animal Science Student Ambassadors
- UF Animal Science Small Ruminant Unit Student Employees & Volunteers
- UF Horse Teaching Unit Student Employees & Volunteers
- Small Ruminant Short Course attendees
- UF Ram Test Sale buyers & bidders

All data is available on our website...

https://animal.ifas.ufl.edu/smallruminant/ramtest/

https://animal.ifas.ufl.edu/smallruminant/buck-test/

Certificates

- Champion & Reserve Champion
  - Overall Index
  - Overall FEC Index
  - Overall Growth Index
  - REA

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