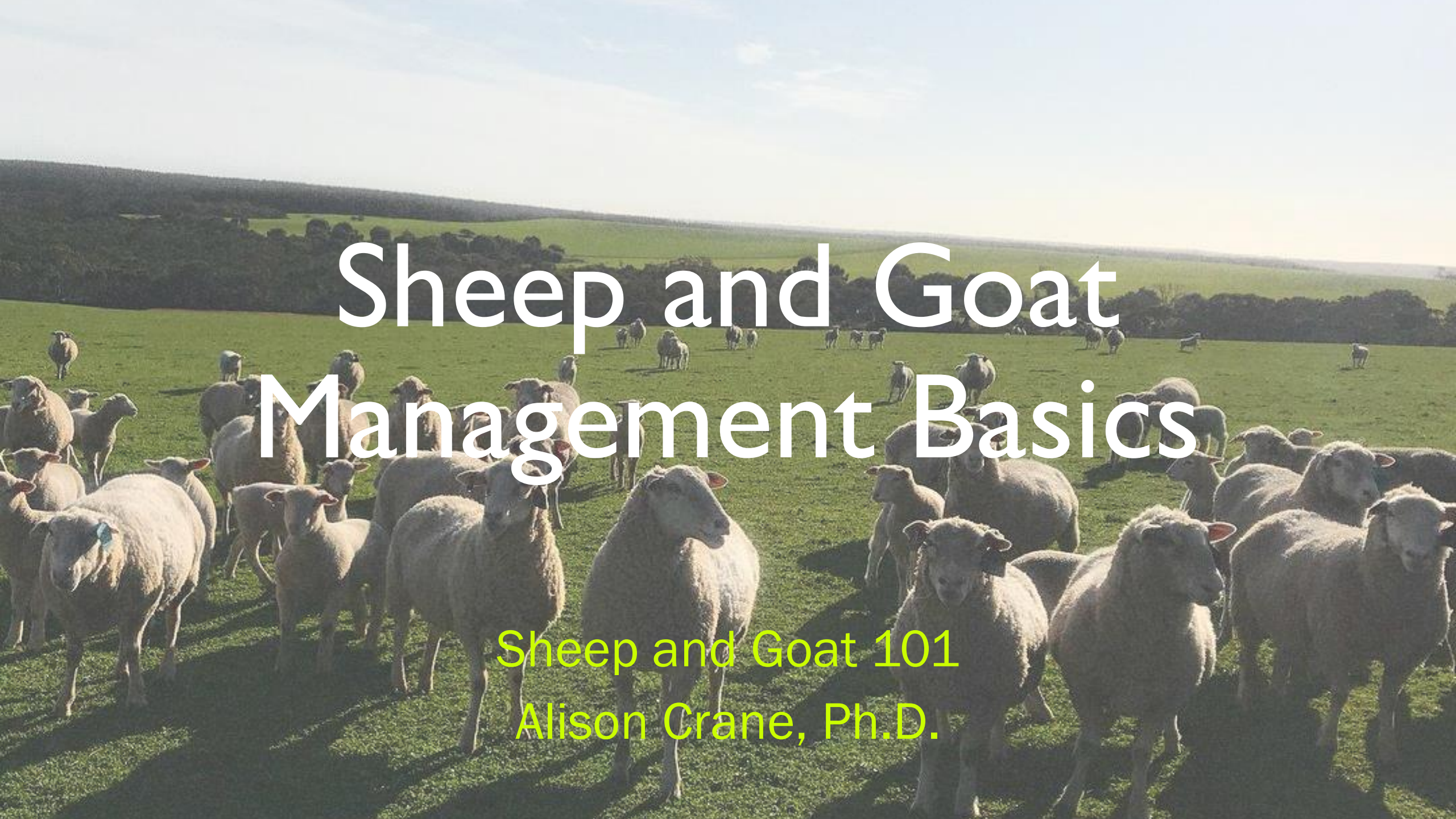


Sheep and Goat Management Basics

Sheep and Goat 101

Alison Crane, Ph.D.

Changing Industries

- Women as Principal Operator, USDA
  - 2012, 13.66% of farms; 2017, 29.13% → 15.47% increase
  - 36% American producers are women; 31.5% increase since 2012
    - 500,000 more women involved in Agriculture
- Wool/Mohair/Fiber is making a comeback
  - Support the infrastructure
- Lamb is too
  - Foodies, Millenials and GenZs
  - Natural, Grass-fed

https://www.agdaily.com/insights/2017-census-of-agriculture-women-farmers/

What's the Most Important?

Rule #1

"Do what you love and you'll never work a day in your life"

- You will, so take pride in it and love it
- If you don't care, can't expect other too

Rule #2

There are no superior breeds of sheep/goats; Only superior managers

See rule #1

Rule #3

If you are passionate about it, you will love learning about it and how to be better

This will make you a superior manager and producer of products

GOAL Setting

Must ask yourself some questions:

- What animals do you want?
  - Will they be profitable in your environment?
- What do you want those animals to be able to produce?
  - Can they produce in your environment at a profitable level?
- Can you market those products where you live? In your region?
  - Do you want to?
- Do you want to be profitable?
  - If not, need a different set of questions here.
- Will you enjoy pursuing the goals you have set for your operation?
  - If not, reassess…

REPRODUCTION

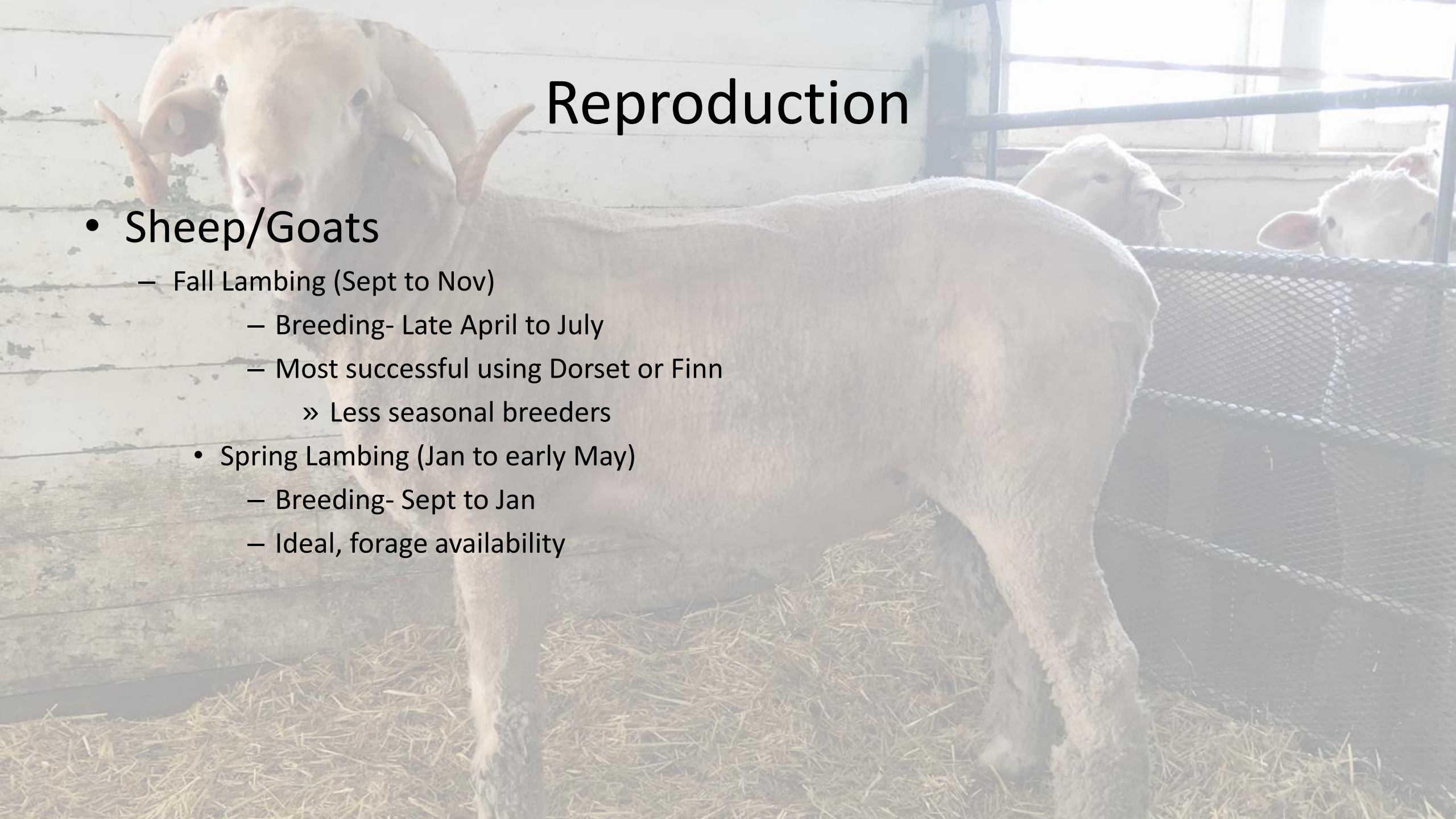
Reproduction

- Seasonality, dependent on hours of daylight
  - **Seasonally polyestrus******
- Sheep
  - Estrous cycle = 17 days
  - Breeding Season = 2 cycles or 34 days
  - Ram: Ewe ratio = 1:40-50
- Goats
  - Estrous cycle = 21 days
  - Breeding Season = 2 cycles or 42 days
  - Buck: Doe ratio = 1:40-50

Reproduction

- Sheep/Goat
  - Gestation period = ~ 5 months
    - Singles, **Twins**, Triplets
      - Lambs 8-16 pounds
      - Kids 7-10 pounds
    - Some sheep are litter bearing
  - Lactation period = 45 to 60 days

Reproduction



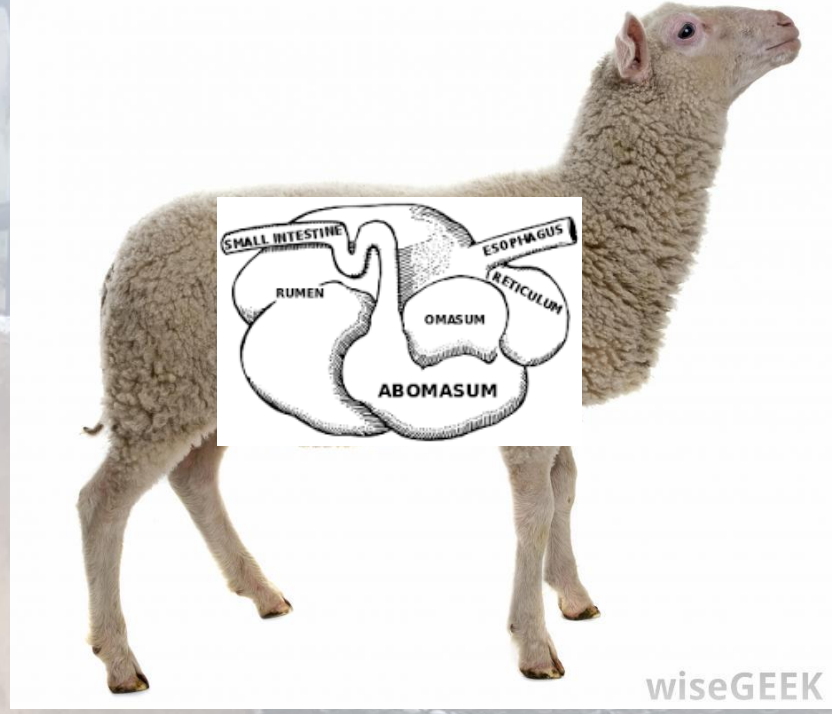
- Sheep/Goats
  - Fall Lambing (Sept to Nov)
    - Breeding- Late April to July
    - Most successful using Dorset or Finn
      - » Less seasonal breeders
  - Spring Lambing (Jan to early May)
    - Breeding- Sept to Jan
    - Ideal, forage availability

Reproduction

- Fall
  - Usually more difficult because of hot summer weather
  - Hormones or selection
    - Management
  - Feed availability
- Spring
  - Ideal in terms of forage availability
  - Jan/Feb not really the ideal for Kansas, MW, West
  - Less management

NUTRITION

Nutrition 101



- Faulty nutrition:
  - Failed reproduction, Ewe Health
  - Lamb death from birth to weaning
- Sheep/Goat production is:
  - Efficiency of converting feed resources (pasture, forage, or grain)
  - Into products of economical value (meat, wool, or milk)
- Feed is the largest cost associated with livestock production
- But, what is nutrition?
  - The sum of the processes by which an animal takes in and assimilates the nutrients in feeds.

Nutrient Requirements

- Change with:
  - Weight
  - Stage of Production
  - Level of Production
  - Age

- Change with:
  - Climate
  - Level of Wool Production
  - Physical Activity
  - Diseases and Parasite Load
  - Body Condition

Nutrients

- Water
- Energy:
  - Carbohydrates
- Protein
- Vitamins
- Minerals

Minerals

- Sixteen essential minerals:

Mineral	Requirement	Deficiency	Toxicity
Salt	0.5-1.0% of diet	Feed/water intake, production, chewing wood/dirt	Death possible, but not likely
Calcium	0.2-0.82% of diet	Rickets, tetany, urinary calculi	Not likely, deficient in o/minerals
Phosphorus	0.16-0.38% of diet, 2:1 ratio, most grains excess	Rickets, slow growth, decreased appetite	Urinary calculi
Magnesium	0.12-0.18% of diet	Skeleton, tetany, frothy mouth, falling on side, death- Spring grazing ewes	Not likely
Potassium (Grass Tetany)	0.50-0.80% of diet	Listlessness, stiffness, convulsions, death	3% of diet (DM) causes depression of Mg absorption
Sulfur	0.14-0.26% of diet	Loss of appetite, reduce gain, wool growth, shed	0.4% of diet, decree intake- tie up CU, Mb
Copper	7-11 ppm, most feeds adequate, but can be tied up	Decreased immune status, swayback, stringy wool, infertility	25 ppm, RBCs splice, death! Do not use mineral salts for other species

Major Points

Goals

- ***Quantity and quality of what sheep eat***
  - ***Nutrition or energy intake***
- ***Controls their fatness (body condition)***
  - ***Which in turn directly affects a number of production factors***
  - ***Offspring survival***

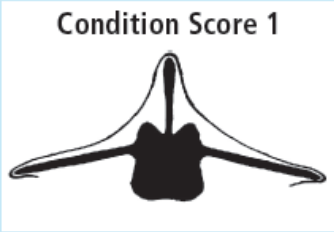
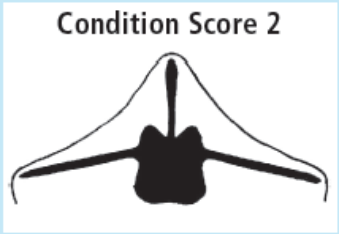
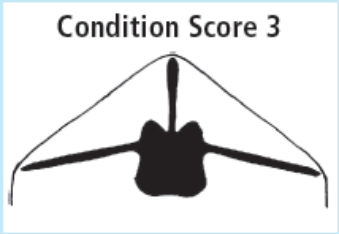
Major Points

Goals

- Begins long before lambing/kidding season
- Early management of the ewe/doe flock
  - Can prevent many headaches throughout gestation, during and following parturition
- Managing ewes/does can have a direct influence on the lambs/kids and their prosperity in life

Body Condition Scoring

- Over- and under-nutrition are not accurately determined by body weights
- Body Condition Scoring (BCS) estimates external fat cover
- BCS:
  - Scale: 1-5
  - 1 = extremely thin
  - 5 = extremely fat

	Backbone	Short Ribs
 Condition Score 1	The bones form a sharp narrow ridge. Each vertebra can be easily felt as a bone under the skin . There is only a very small eye muscle. The sheep is quite thin (virtually unsaleable).	The ends of the short ribs are very obvious. It is easy to feel the squarish shape of the ends. Using fingers spread 1cm apart, it feels like the fingernail under the skin with practically no covering.
 Condition Score 2	The bones form a narrow ridge but the points are rounded with muscle. It is easy to press between each bone. There is a reasonable eye muscle. Store condition- ideal for wethers and lean meat.	The ends of the short ribs are rounded but it is easy to press between them. Using fingers spread 0.5cms apart, the ends feel rounded like finger ends. They are covered with flesh but it is easy to press under and between them.
 Condition Score 3	The vertebrae are only slightly elevated above a full eye muscle. It is possible to feel each rounded bone but not to press between them. (Forward store condition ideal for most lamb markets now. No excess fat).	The ends of short ribs are well rounded and filled in with muscle. Using 4 fingers pressed tightly together, it is possible to feel the rounded ends but not between them. They are well covered and filled in with muscle.
 Condition Score 4	It is possible to feel most vertebrae with pressure. The back bone is a smooth slightly raised ridge above full eye muscles and the skin floats over it.	It is only possible to feel or sense one or two short ribs and only possible to press under them with difficulty. It feels like the side of the palm, where maybe one end can just be sensed.
 Condition Score 5	The spine may only be felt (if at all) by pressing down firmly between the fat covered eye muscles. A bustle of fat may appear over the tail (wasteful and uneconomic).	It is virtually impossible to feel under the ends as the triangle formed by the long ribs and hip bone is filled with meat and fat. The short rib ends cannot be felt.

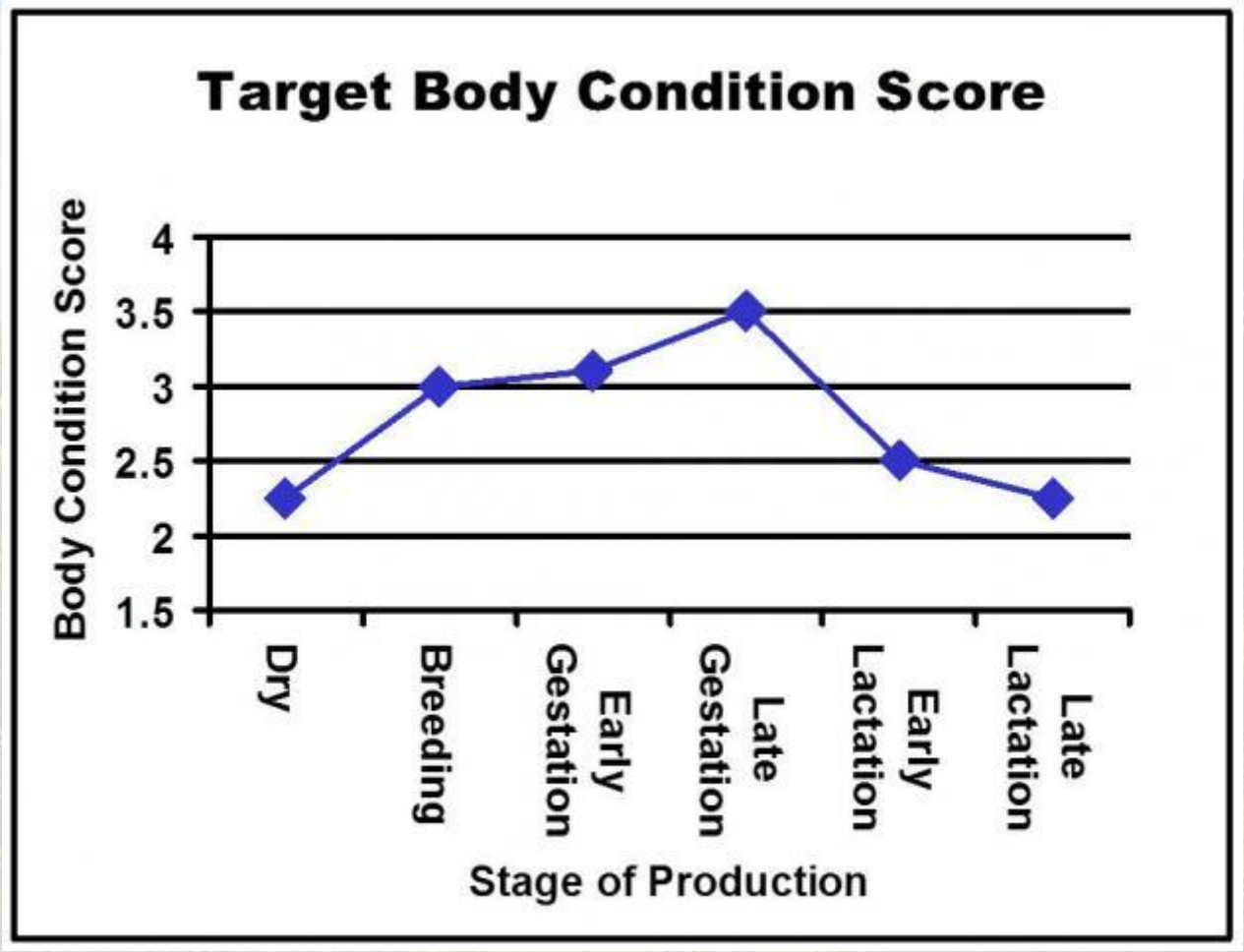
Target Body Condition Scores

Stage of Production	Target BCS
Dry Ewe	1.5 to 2.0
Breeding	2.5 to 3.0
Early Gestation	2.0 to 2.5
Late Gestation*	2.5 to 3.0
Early Lactation*	3.0 to 3.5
Late Lactation, Weaning	2.0 to 2.5

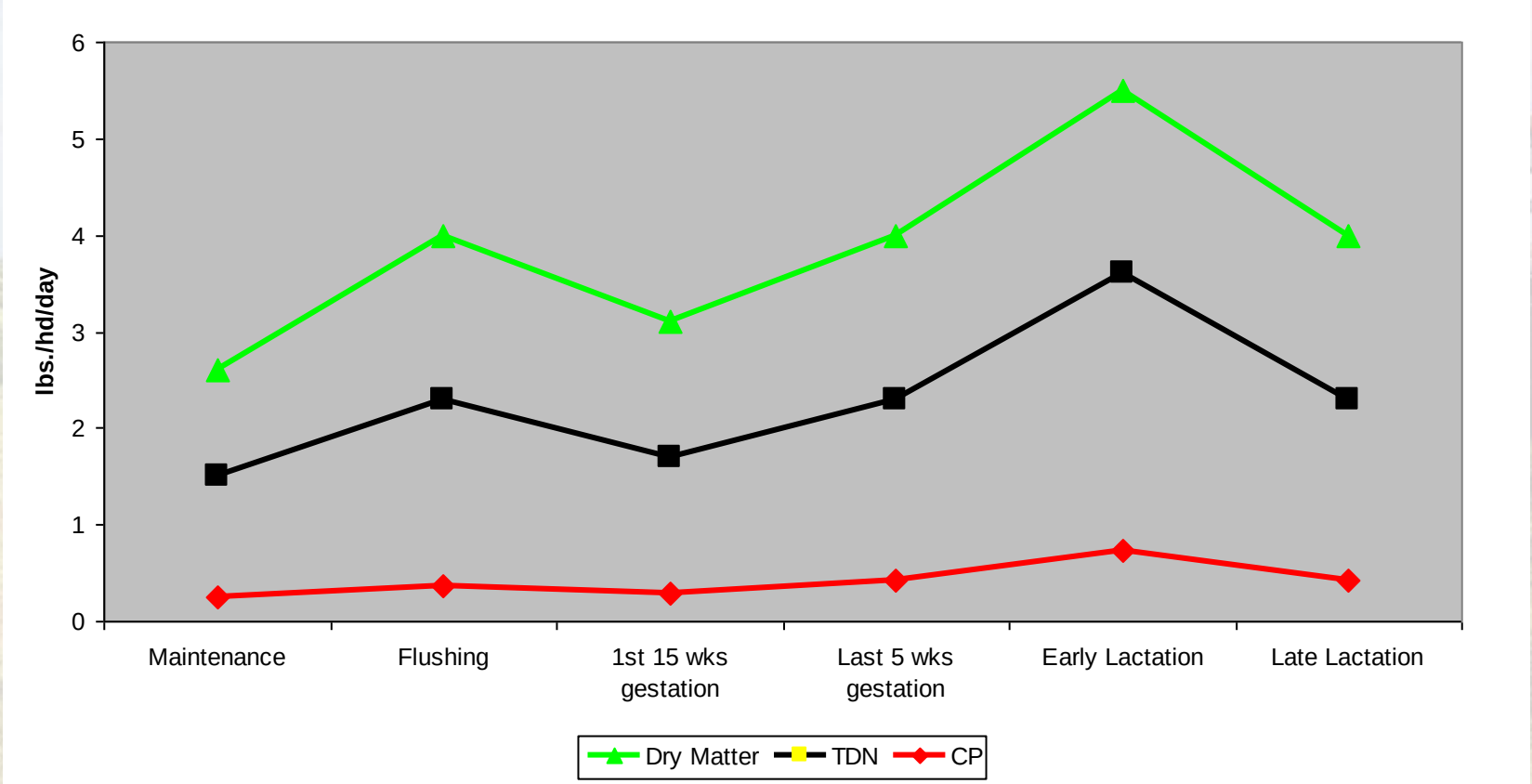
*Add 0.5 to BCS for ewes expecting or nursing twins.

10-12% change in BW required to change BCS 1.0 units.

Target BCS


Target Body Condition Score
Body Condition Score
4
3.5
3
2.5
2
1.5
Dry
Breeding
Early Gestation
Late Gestation
Early Lactation
Late Lactation
Stage of Production

Doe Diets, Production Stage



Proper Management Can Prevent

- **Pregnancy Toxemia (Ketosis):** Caused by rapid fat mobilization during late pregnancy
  - Most common in over- or under-conditioned females
  - Commonly affects does with triplets or quads
  - Glucose (oral, sub q, or i.v.) is the usual treatment
- **Milk Fever:** can occur pre-partum or post-partum
  - Symptoms similar to pregnancy toxemia
  - Response to calcium therapy (oral or i.v.) is the definitive indicator

Lamb/Kid Management

- First 48 hrs of a lamb/kids life are critical
  - 70% of mortality occurs between birth and weaning
  - Lamb/Kid survival is related to BW
  - BW related to the nutrition of the female during pregnancy, last trimester
- Optimum BW for max lamb survival is 10-13 lbs (Kid = 6-8 lbs)
  - But, environment and birth type affect this

Newborn Lamb/Kid Management

- **Three main causes of death:**
  - **Starvation/Hypothermia**
  - **Pneumonia**
  - **Difficult Birth**

  → **Maternal Genetics, Nutrition, some not manageable**
- **Pneumonia:**
  - **Some management: barns, draft, ventilation**
    - **Can lead to chronic pneumonia**

Lambs

At Birth

- Normal: 102-103 F
- Hypothermic: <100 F
  - Tubing
  - Colostrum
  - Milk Replacer
- Best Option:
  - Milk from ewe/doe, Others in flock, frozen/fresh reserves

Checklist

- Tagging
- Weighing
- Branding
- Docking (Banding, Cut, etc.)
- Castration (Banding, Cut, etc.)
- Some: vaccinate, anti-toxin

Tool Bucket

- OB sleeves
- OB lube
- thermometer
- ear tags and tagger
- vaginal retainer
- lamb warming box
- heat lamps
- scissors
- docking and castration tools
- stomach tube with 60 cc syringe
- bottle with lamb nipples
- frozen colostrum

- lamb milk replacer
- 18 and 20 gauge needles (1 inch)
- 3, 6, and 12 cc syringes
- 7% iodine solution
- injectable selenium/vitamin E
- tetanus antitoxin
- fly spray
- propylene glycol
- antibiotics
- electrolytes

Ewes/Does

Lactation

- Lambing/Kidding Rate affects nutrient demand
- Old and yearling ewes/does need higher energy rations
  - Early lactation = Highest requirements
  - Need to be losing BCS
- Enter each stage of production at adequate BCS

LAMBS/KIDS: POST-WEANING

Growing and Finishing Lambs

- Wean as early as 60 days or as late as 120 days
- Sold for slaughter at 130 – 140 lbs
  - 0.15 to 0.25 in. backfat and YG less than 3.0
- Diets can range from predominately forage to predominately grain
  - Adjust to grain ration over 2 – 3 wks

Ration Balancing Software

- **OSU Ration Software:**
  http://agecon.okstate.edu/meatgoat/
- **Other software:**
  http://agecon.okstate.edu/meatgoat/record.asp
- Https://msusheepration.montana.edu/
- Brands (Iowa State)

HEALTH

Vaccines for Sheep and Goats

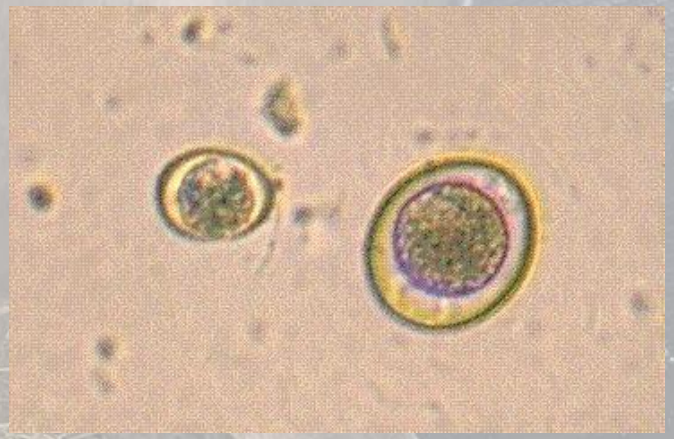
- Annually across flock:
  - Clostridium type C and D
    - Annual booster
    - Some prefer the 8-way
  - To consider: Parainfluenza (Pi3), campylobacter (Vibrio)
  - You might hear: orf, foot rot, chlamydia, E.coli, rabies, CL
- CD-T pre-breeding to females and Rams/Bucks (30 d prior)
  - Booster females 3-4 wks before parturition
  - Give to lambs/kids: 2 weeks prior to weaning and at time of weaning
    - Give to kids at banding/disbudding

External Parasites

- Lice, ticks, mites, etc.
- Ewes/Does:
  - Pour/inject prior to lambing/kidding
  - Wool sheep: immediately after shearing
- Products:
  - UltraBoss
  - Ivomec Plus

Internal Parasites

- Internal
  - Strongyles
    - *Trichostrongyle* spp.
    - *Nematodirus* spp.
    - *Haemonchus* spp.
  - Whipworms
    - *Trichuris*
    - *Capillaria* spp.
  - Tapeworms
    - *Monezia* spp.
  - Coccidia
    - *Eimeria* spp.



Internal Parasite Control

- Pasture factors
  - Stocking density needs to be < 6-8 head/acre
  - Bermuda, brome, other improved pastures, form a dense canopy
    - 155^{o}F in sun-exposed fecal pellets
  - Sparse brush allows for heat and drying of fecal pellets
  - Changes will be reflected in worm burdens in 3 to 8 weeks

Internal Parasite Control

- Animal factors
  - Young animals
  - Genetics
    - 20% of animals harbor 80% of worms [sheep and goats]
  - New purchases, social, weather stresses
  - Immunosuppression of individuals
  - Periparturient rise
    - Large increase in infections from 2 weeks prior to until 8 weeks after delivery

Internal Parasite Control

- Drugs factors
  - Drugs are related
  - Rotation of dewormers is not currently recommended
- No new drugs are being made
  - There are no “better dewormers”
  - There are no “broad spectrum dewormers”
- No drug has ever been or ever will achieve 100% kill
- Drug resistance is a random event
  - But we do speed it up

Plan of Attack

- Deworm frequently? High doses?
  - **NO!!**
  - Monitor risk

- Ways to monitor
  - Composite sampling of fresh dung (DrenchRite)
    - Test 10% of each animal group or 10 animals, whichever is greater
    - For dewormer decisions and evaluation
    - Serial monitoring of herd
  - Selective sampling of individuals
    - For individual thin animals

Parasites

- Diagnostic strategy
  - **Fecal Egg Count Reduction Test (FECRT)
    - Modified Stoll's, deworm, repeat Modified Stoll's in 14 d
  - Used to verify drug efficacy
  - Reduction of EPG by >90%
  - Lower reduction = trouble
    - Resistance
    - Lack of efficacy
      - Dose, route, drug, weight

Internal Parasite Control

- Treatment strategies
  - **Goal is not no worms!**
  - **BUT**, manageable numbers in animals and on pasture, who are susceptible to treatment if they become a problem

GENETICS

Guiding Principles

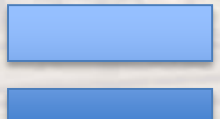
- If you don’t measure it, you can’t manage it
- The best way to know how much something weighs, is to weigh it
- Not all traits should be measured
- Populations respond to selection
- Selection without an objective that includes profit, is a hobby
- EPDs are currency of realm (Spangler)

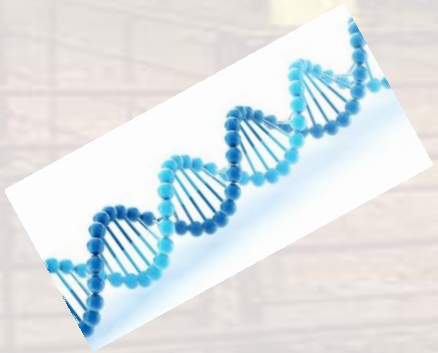
Tools for Genetic Selection

- National Sheep Improvement Program
  - "A profit driven genetic selection tool"
- Our Mission
  - To provide predictable, **economically important genetic evaluation** to the American sheep industry by converting performance records into relevant decision making tools.

Adjust For Variation

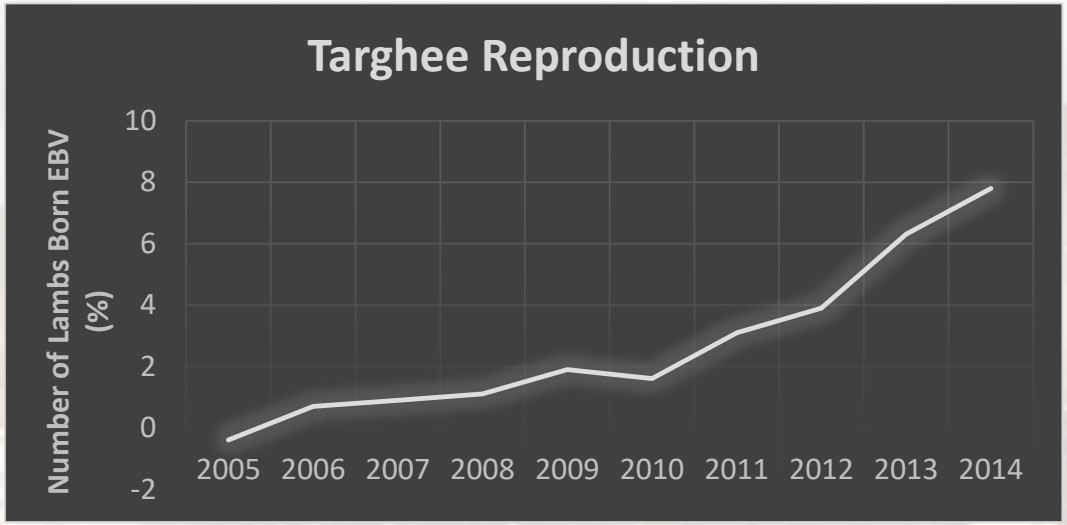
- NSIP analysis accounts for all the non-genetic factors (Birth Type, Heritability, Feed…)

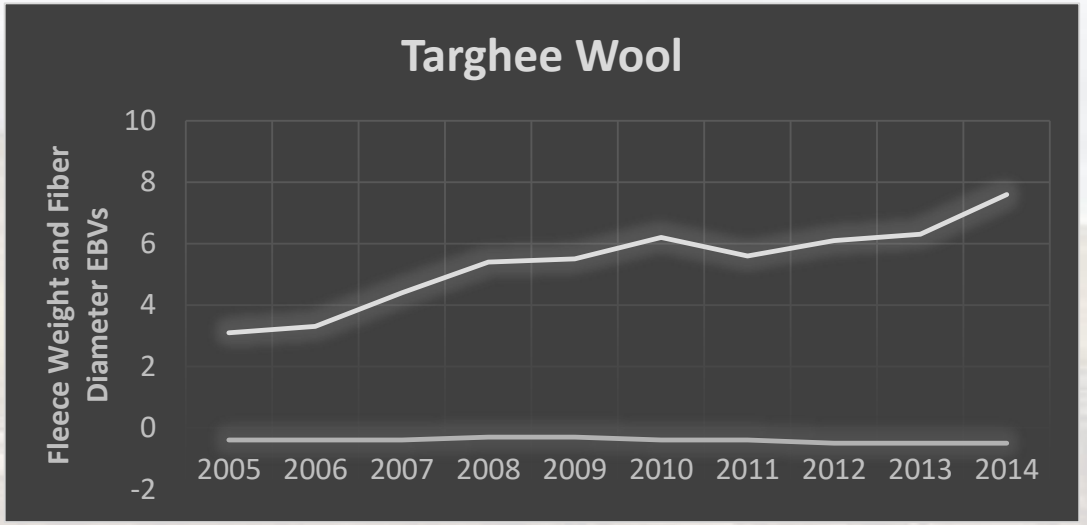


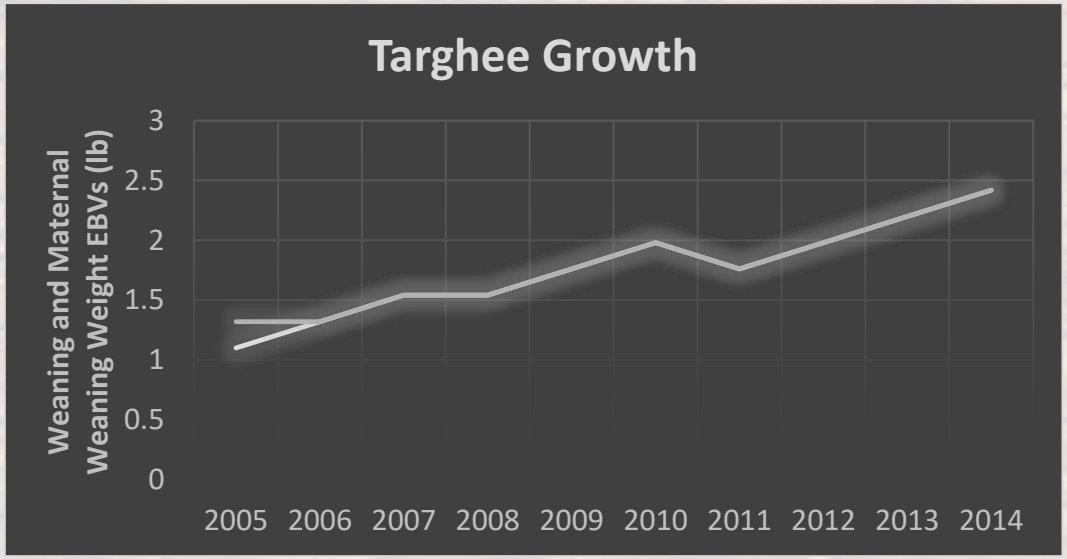


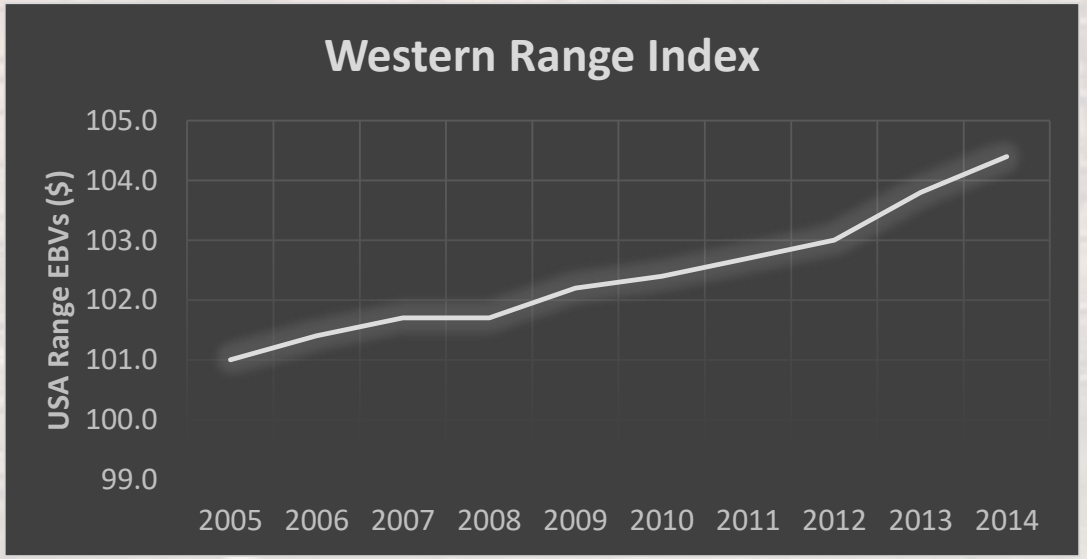
Phenotype = Genetics + Environment

Does it Work?

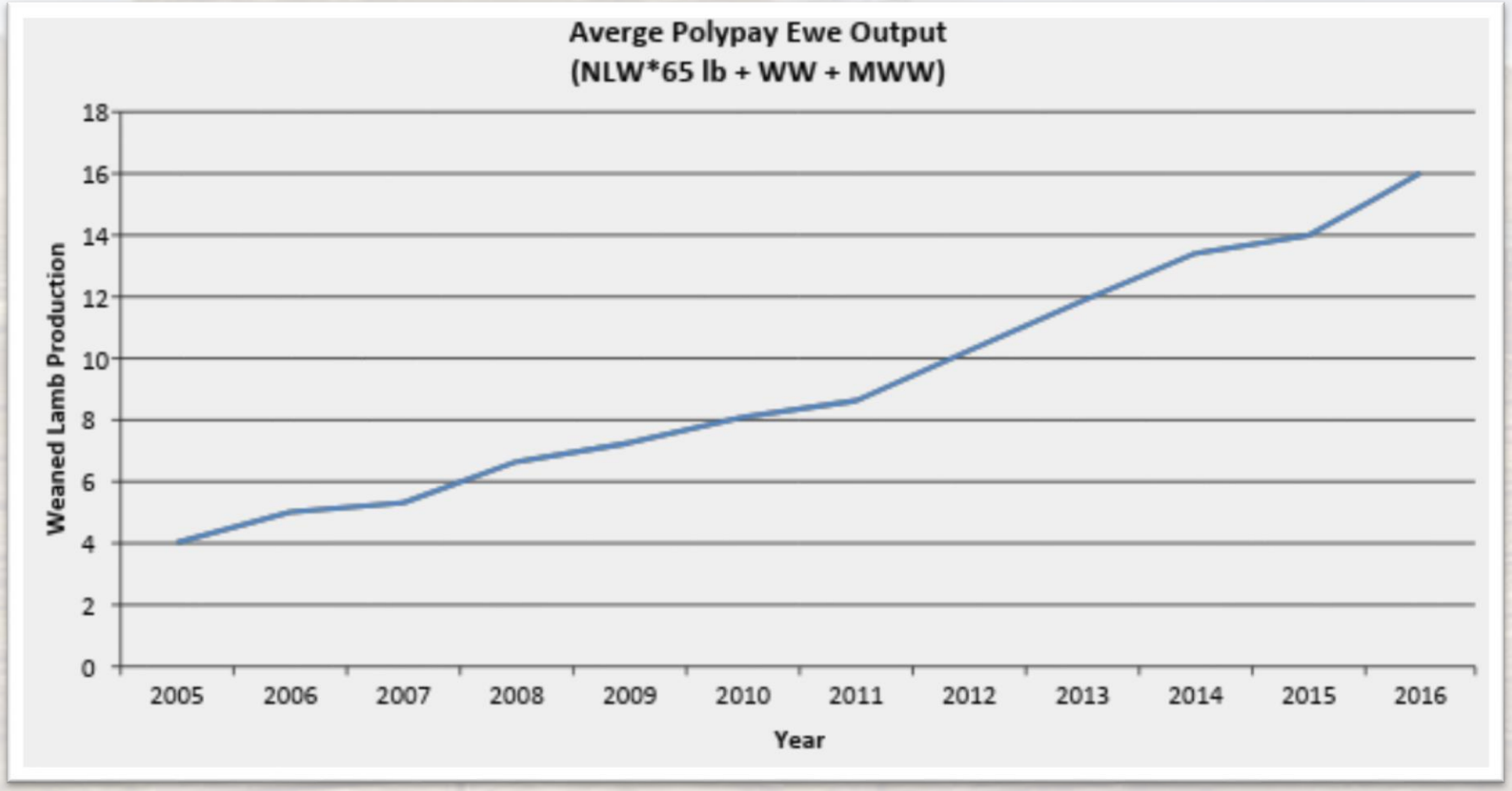

Targhee Reproduction
Number of Lambs Born EBV (%)
10
8
6
4
2
0
-2
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014


Targhee Wool
Fleece Weight and Fiber Diameter EBVs
10
8
6
4
2
0
-2
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

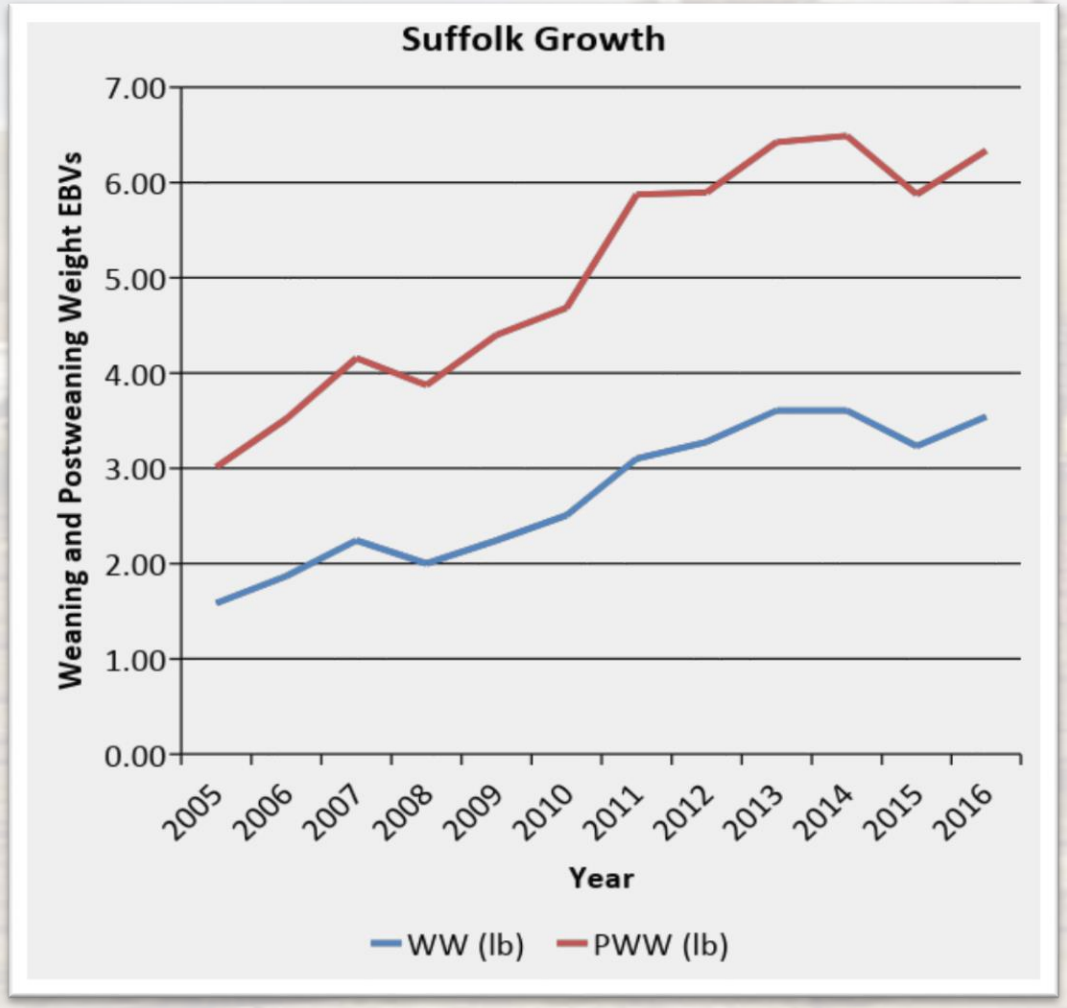

Targhee Growth
Weaning and Maternal Weaning Weight EBVs (lb)
3
2.5
2
1.5
1
0.5
0
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

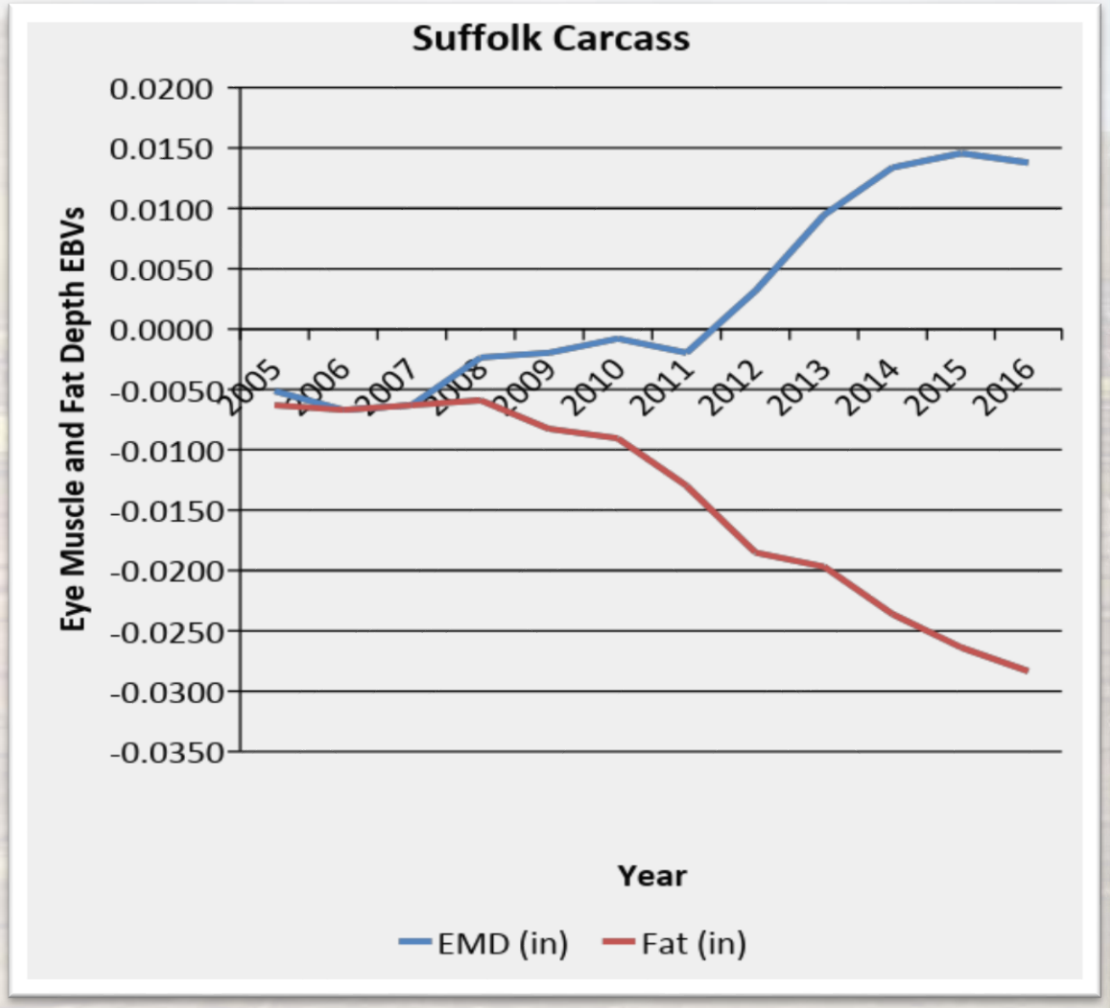

Western Range Index
USA Range EBVs ($)
105.0
104.0
103.0
102.0
101.0
100.0
99.0
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

Genetic Progress-Polypay

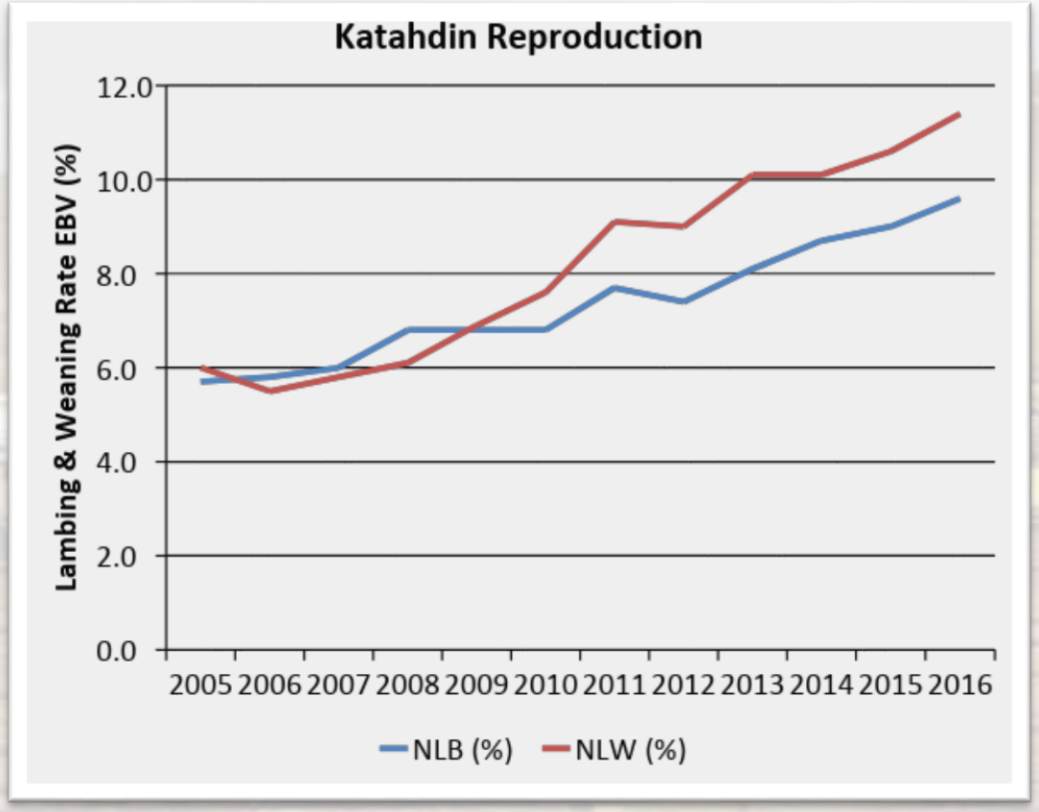


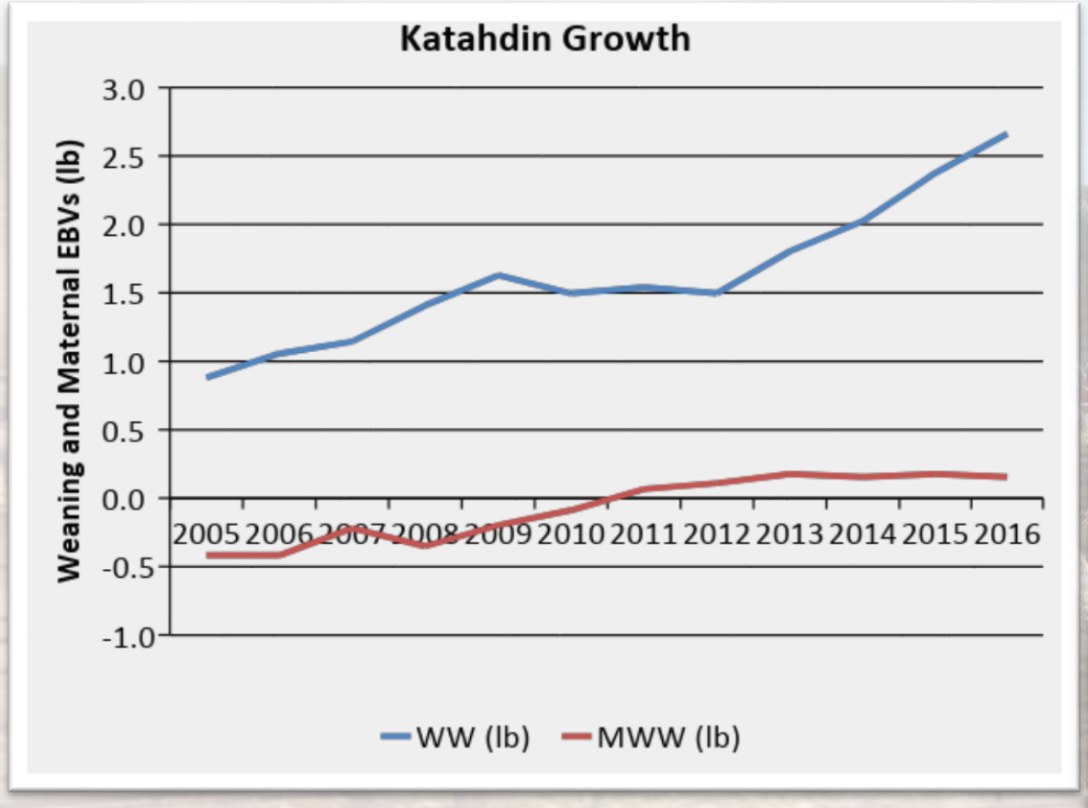
Genetic Progress-Suffolk



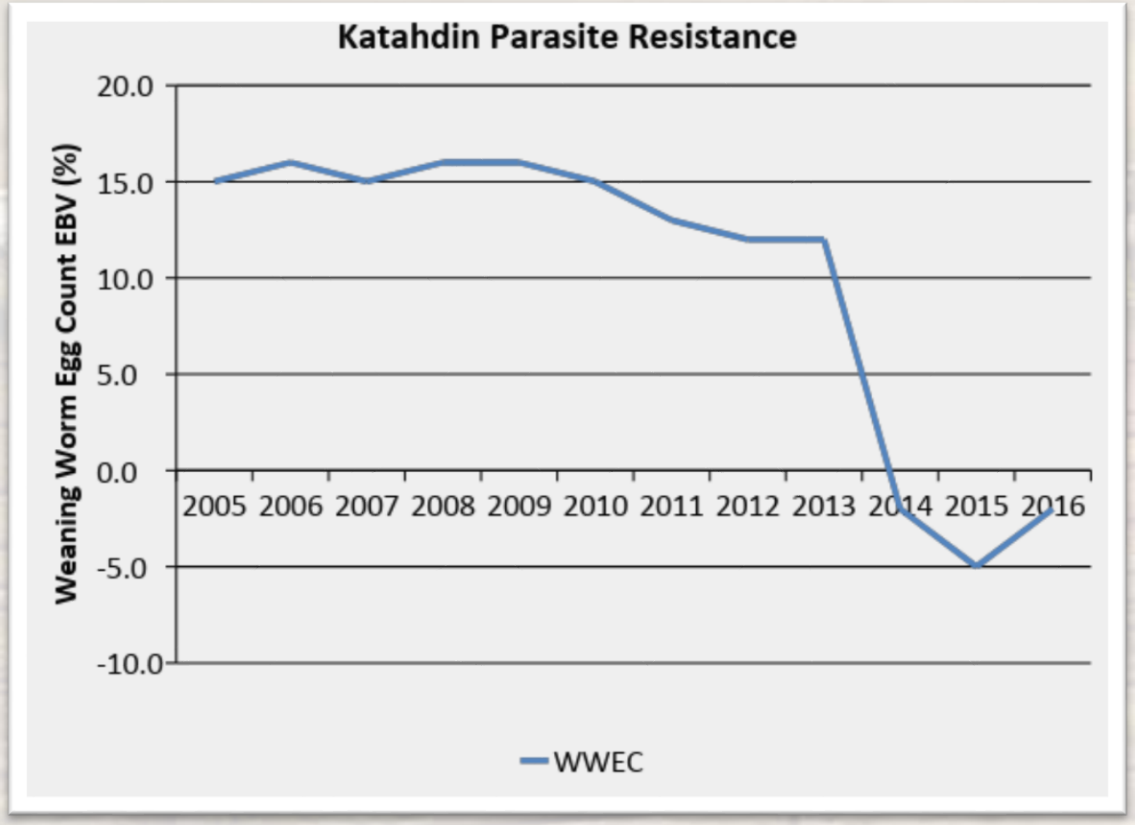


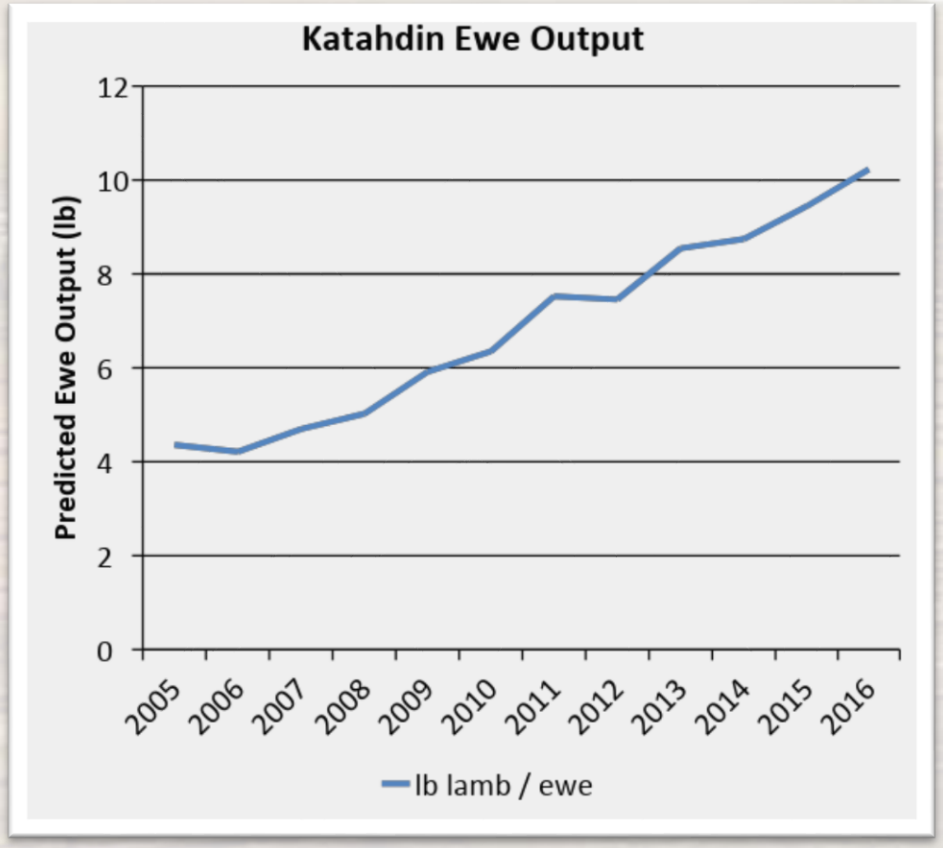
Genetic Progress-Katahdin





Genetic Progress-Katahdin





Efficiency

- Production efficiency has to be the priority
  - High weaning
  - High feed efficiency

  OR

  - Higher lambing/weaning rates
  - Maternal Ability- milk, mothering ability

MARKETING AND FINAL NOTES

Technology that Really Works

- How do we collect all of this data?
  - EID Tags and systems:
    - Shearwell (UK)
    - Prattley (NZ)
    - Sapien Technologies and Gallagher
    - BreedElite (AUS)
  - Systems capable of sorting based on almost any data, qualitative traits
  - Costs:
    - $2500 or more depending on brand, piece of equipment, etc.
    - $1.25/tag

Marketing: How Can You Tell Your Story?

- Farm to Plate
  - https://www.youtube.com/watch?v=8tMrQFKeTe4 → Superior Farms, Emigh
  - https://www.youtube.com/watch?v=U7xMJVQWa3A → SF, Osguthorpes
- Farm to Fabric
  - https://www.facebook.com/matt.mastrantuono/videos/10104078211887558/?t=26 → Pendleton Wool
  - https://www.youtube.com/watch?v=iYAJj18_Y9E → Icebreaker Wool
  - https://www.youtube.com/watch?v=AW-7R1nLtDA → Duckworth

Other Things to Consider:

- Facilities
  - What do you already have?
  - How could it be adapted?
  - How much space is needed?
  - Chutes, alleys, etc.
  - Jugs
- Things to Change:
  - Fencing, predator challenges, lambing/kidding

Resources

- **Genetic information: Nsip.org**
- **Lifetime Ewe Management: http://www.lifetimewool.com.au**
- **Purchase feeds on nutrient costs (APP)**
  - https://www.igrowlivestocktools.org/#!/calculators/feed-cost
- **WYO Ranch Tools:** https://uwyoextension.org/ranchtools/
- **KSU:** https://www.agmanager.info/decision-tools
- **Parasites:** https://www.wormx.info/

Alison Crane, Ph.D.
Sheep and Meat Goat Extension Specialist
Kansas State University

Email
arcrane@ksu.edu

Facebook
Facebook.com/KSUSheepandGoatExtension

Growing/Finishing Lamb Rations

Period	Corn	Hay	SBM	Mollasses
Up to 70 lbs.	49	33	10.5	5
70 – 90 lbs	59	23	10.5	5
90 lbs and up	69	13	10.5	5

1% Dicalcium phosphate

1%TM salt + Selenium

0.5% Ammonium chloride

Early Gestation (wk 1-15)
Ewe Rations

	Hay	Corn Silage	Haylage	Straw	Grain	SBM
1	3.5					
2	2.0				1.0	
3		6.0				0.25
4			5.0		0.5	

Late Gestation (wk 16-20)
Ewe Rations

	Hay	Corn Silage	Haylage	Straw	Grain	SBM
1	3.5				0.5-1.0	
2	2.0				1.5-2.0	
3		6.0			0.75	0.4
4			7.0		0.75	

Early Lactation (wk 1-6)
Ewe Rations

	Hay	Corn Silage	Haylage	Straw	Grain	SBM
1	4.0				2.0	
2	1.0	7.0			1.0	0.65
3		9.0			1.0	0.85
4			8.0		2.0	

Late Lactation (wk 7-10)
Ewe Rations

	Hay	Corn Silage	Haylage	Straw	Grain	SBM
1	4.0				1.0	
2	1.0	7.0			0.5	0.65
3		9.0			0.5	0.85
4			8.0		1.0	