

# Replacement Ewe Selection and Culling of Underperforming Ewes

Presenter:

Susan Schoenian  
Sheep & Goat Specialist  
University of Maryland Extension

Host/Moderator: Jay Parsons

October 3, 2017



This webinar is made possible with funding support from the Let's  
Grow Committee of the American Sheep Industry Association.



# Replacement ewe selection and culling underperforming ewes

**SUSAN SCHOENIAN | UNIVERSITY OF MARYLAND | [SSCHOEN@UMD.EDU](mailto:sschoen@umd.edu)**

# Replacement ewe selection and culling underperforming ewes

## SELECTION



Choosing which females get to be the mothers of the next generation.

## CULLING



Choosing which females need to be removed from the flock.



**Selecting  
replacement  
ewes**

# Selection basics

- Determine the goals of your sheep breeding enterprise, based on your resources, management style, and markets.
- Identify the strengths and weaknesses in your flock.
- Identify areas you want to improve, without compromising other traits.
- Select the females that meet your criteria.



# Selection strategies

## SINGLE TRAIT

- Quickest way to make progress in individual trait.
- Single trait selection can have (negative) unintended consequences, due to correlated traits.
- Single trait selection is not recommended.

## MULTIPLE TRAITS

- Selecting for more than one trait at a time.
- Many traits affect the profitability of A sheep enterprise.
- Most common and practical method of selection.
- Shouldn't select for too many traits at one time.

# Selection methods

## TANDEM

- Select for one trait at a time until a certain level of performance is achieved. . . and then another.
- Examples:  
Parasite resistance  
then growth

## INDEPENDENT CULLING LEVELS

- Set minimum standards for traits involved in multi-trait selection.
- Selected animals must meet all standards.

### Examples:

Born/raised twin  
WWT ratio > 100%  
Did not require deworming

## SELECTION INDEX

- Weight multiple traits according to their economic importance.
- May need to update index as economics change.
- Examples:  
Lbs. lamb weaned  
NSIP-EBV indexes

# 1<sup>st</sup> decision: buying vs. raising

## BUYING

- Easy: can breed all of your ewes to a terminal sire and sell all the lambs as market lambs.
  - Superior market lambs
  - No risk of inbreeding
  - Feed them all the same
  - Only one breed of sire needs to be maintained.
- Can purchase replacements from farms that specialize in production of replacement females.
- Sometimes mature ewes (still sound) are available for purchase.
- Might be cheaper to buy replacements.

## RAISING

- Maintain (mostly) closed flock
  - Better biosecurity
  - Reduced disease risk
- Can breed for traits that are most important to you.
- Can raise (develop) replacements the way you want to.
- Might be cheaper to raise your own replacements than to purchase them.

# Buying: #1 consideration is health.

- Most diseases walk onto your farm in an animal.
  - Abortions
  - Caseous lymphadenitis (CL)
  - Johne's disease
  - Foot rot
  - Pink eye
  - Scrapie
  - Sore mouth
- Purchased animals can also introduce resistance worms to your farm.



# Considerations for buying older ewes

- Yearlings  
May not be readily available, why wait until 2 for ewe to have lambs?
- 2-5 years old  
Why are they being sold? Liquidation?
- 5-6 years old  
How old are they? Age is a concern.
- Short-termers  
Buyer beware !



Sound mouth + sound udder

# Breeding for replacement



# What percentage of your flock do you need to breed for replacement ewe production?

Depends on replacement rate and lambing percentage.  
Lambing percentage = # lambs raised/# ewes exposed.

Flock size	# needed	Lamb %	♀ lambs	% flock
100	20	80	40	50
100	20	100	50	40
100	20	120	60	33
100	20	140	70	29
100	20	160	80	25
100	20	180	90	22
100	20	200	100	20

# Breeding for replacement

## SEEDSTOCK PURE BREEDING

- Breed best rams to best ewes.
- Select best ewe lambs.

## COMMERCIAL

### TERMINAL CROSSING

- Breed top 30% of flock to maternal sire to produce replacement females.
- Breed bottom 70% to terminal sires to produce market lambs; sell all ewe lambs from this cross.

## COMMERCIAL

### ROTATIONAL CROSSING

- Rotational crossbreeding systems generate replacement ewes.
- Use dual-purpose breeds.

# Types of sires

## MATERNAL

- Sires that excel in maternal and fitness traits.
- Use to sire replacement females



## TERMINAL

- Sires that excel in growth and carcass traits.
- Use to sire market lambs.

## DUAL PURPOSE

- Suitable as either sire or dam breed.

# Classification of some common US sheep breeds

(Terminal) Sire	Dam			Dual-purpose
	Wooled	Dairy	Hair	
Hampshire Oxford Shropshire Southdown Suffolk Texel	Clun Forest Finn Leicesters Merino Polypay Rambouillet Romanov Romney Targhee	Awassi East Friesian Lacaune	Barbado Katahdin St. Croix	Cheviot Columbia Coopworth Corriedale Dorper Dorset Ile de France Montadale Tunis

# Choosing sires for replacement ewe production

- Should be of desired breed or breed cross.  
What breed or cross do you want your ewe lambs?
  - Need to have desired coat or wool type.
  - Need to have desired level of reproduction.
  - Need to have desired level of fitness, relative to production environment.
- Should be breeds and individuals that excel in maternal and fitness traits.



# Selecting replacement females



# Criteria for selecting replacement females

## PERFORMANCE EVALUATION



## GENOTYPE or SEROTYPE



## VISUAL APPRAISAL



# A combination approach is best.

## VISUAL APPRAISAL

- You can't tell how productive an animal is simply by looking at it.
- There aren't significant correlations between visual traits and most production traits.
- Visual appraisal isn't a very accurate method of selection for most economically important traits.



## PERFORMANCE EVALUATION

- You still need to look at your animals.
- Performance records don't identify animals with structural problems or soundness issues.
- Some visual traits are important and can affect an animal's longevity and ability to thrive in its production environment.

# Methods of performance evaluation

## INDIVIDUAL

- Selection on the basis of the individual animal's own performance.

## PEDIGREE

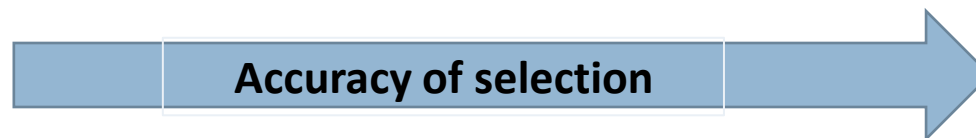
- Selection on the basis of the performance of the animal's parents and other relatives.

## PROGENY

- Selection on the basis of the performance of the individual's offspring.
- N/A for ewe lambs

## BREEDING VALUES

- Mathematical prediction of genetic merit of an animal that uses multiple data sources including performance of individual and all of its relatives.



# Individual animal performance

- Season and date of birth
- Type of birth and rearing
- Weaning weight and/or ratio  
Adjusted for environmental factors
- Post-weaning weights and/or ratios
- Fecal egg count(s)  
Weaning and post-weaning
- FAMACHA© scores  
Need for deworming
- Fleece traits: weight, length, yield  
Wool breeds
- Carcass traits: fat depth, loin depth  
Terminal sire breeds



**Need to individually ID animals and record data.**

# Pedigree selection

## DAM

- History of multiple births and good litter weights/ratios.
- Doesn't miss breeding opportunities.
- Always lambs in fall
- No prolapse
- No lambing difficulty
- No udder problems
- No repeated health problems
- No defects: udder, eyes, bite, fleece

## OTHER RELATIVES

- Productivity of sisters, aunts, grandmother, etc.
- Performance of sire's progeny
- Scrotal circumference of sire



# Estimated breeding values (EBVs)

- Provided by National Sheep Improvement Program (NSIP)
- Calculated by Australia Sheep Genetics.
- NSIP is primarily for purebred flocks: comparisons are for animals in the same breed.
- Non-NSIP flocks and commercial producers benefit by purchasing rams with EBVs for the traits that important to them.
- NSIP data can also be used for in-flock selection: within flock EBVs.



# Anatomy of an EBV

Estimated breeding values are an indicator of how an individual's performance for a trait relates to the average for the breed on NSIP.



In the above example, this ram has an EBV of 3 kg for weaning weight (WWT), which means that ram has the genetic potential to be 3 kilograms heavier at weaning. If he sires progeny, each lamb inherits half of their genes from the ram, so the progeny would be expected to be 1.5 kg heavier at weaning due to the genetic potential inherited from their sire.

There are EBVs for body weight at different ages, carcass measurements, reproduction, parasite resistance and wool.

Source: NSIP Ram Buying Guide

# Selecting replacements using EBVs

## NSIP now has a searchable database

LPN ID	BWT	WWT	MWWT	PWWT	YWT	WFEC	PFEC	PEMD	PFAT	NLB	NLW	US Hair Index
6400302017FAH004	-0.178	-1.093	-0.082	-1.941	-0.421	0	30.45	0.299	1.014	0.114	0.133	104.55
6400302017FAH012	-0.267	0.337	1.251	1.265	3.049	-48.55	-77.99	1.544	0.114	0.072	0.149	108.67
6400302017FAH013	0.066	-0.509	0	-1.304	0.026	32.94	28.91	-0.092	0.783	0.019	0.039	102.53
6400302017FAH045	0.207	0.301	-0.119	-0.035	0.295	36.91	11.54	-1.03	0.612	-0.034	0.057	102.24
6400302017FAH048	0.301	0.867	0.388	0.92	1.398	-16.53	-32.95	-0.726	0.387	-0.042	0.029	102.4
6400302017FAH049	0.225	0.431	0.388	0.044	0.577	-16.53	-32.95	-0.265	0.435	-0.042	0.029	102.29
6400302017FAH054	0.031	-0.306	0	-0.907	0.144	0	0	0.643	0.363	-0.014	0.046	101.53
6400302017FAH061	0.188	1.006	-0.345	1.991	2.327	0	0	-1.104	0.12	0.025	0.107	103.74
6400302017FAH075	0.087	1.345	0.22	2.373	3.181	-5.99	-32.98	0.298	0.114	0.064	0.179	107.86

# Genotype or serotype is often used as a criterion for selection.

- Some selection decisions are made on the basis of genotype or serotype, due to the desire to reduce or eliminate a disease or genetic defect.
  - Scrapie susceptibility
  - OPP susceptibility
  - Spider lamb disease
  - Hairy lamb syndrome
  - OPP – Johne's – CL – Q Fever



**In the future: genomic breeding values**

# Once you're identified animals on paper, you need to look at them.



- Performance records don't identify animals with structural problems or reproductive soundness issues.
- Performance records don't identify animals with genetic defects.
- Some visual traits affect longevity, fitness, and market acceptance or suitability.

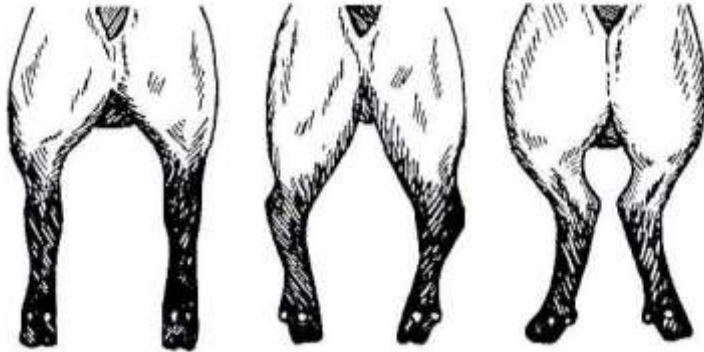
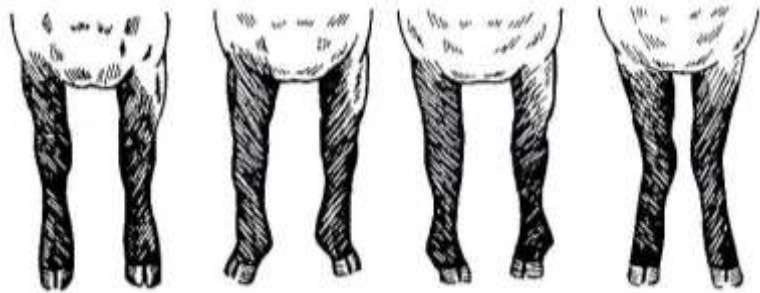
# Selection on visual traits

1. Structural correctness  
Feet, legs, pasterns, jaw/bite
2. Reproductive soundness  
Teats and udder
3. Conformation  
Frame, volume, thickness, bone
4. Coat/fiber/color
5. Breed character
6. Other?

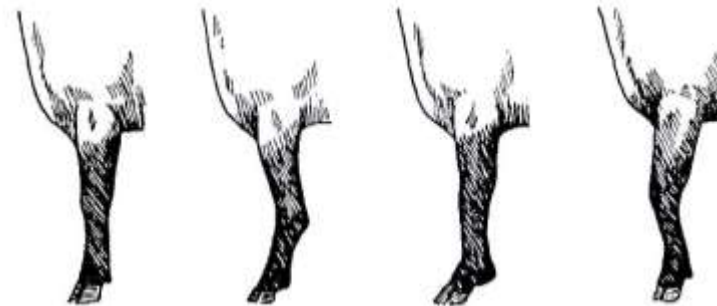
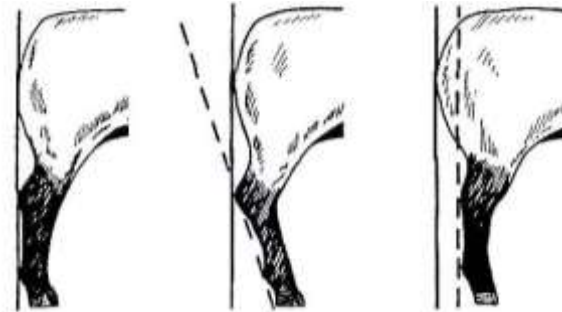


# Feet, legs, toes, and pasterns

## FRONT AND REAR VIEWS



## SIDE VIEWS



First  
picture is  
most  
desirable  
structure.

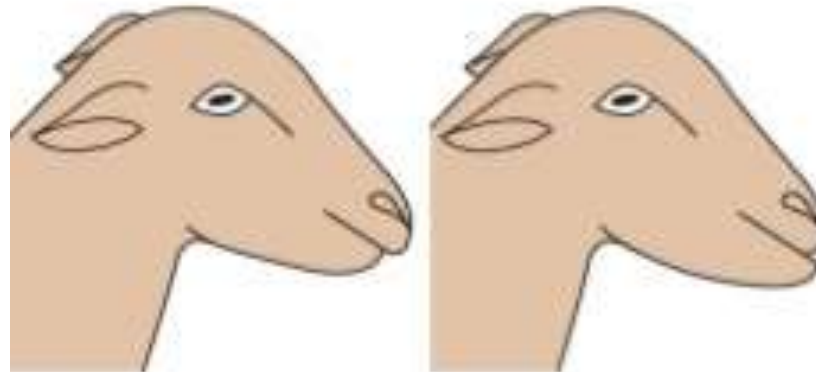
Source:  
Daneke  
Club lambs

# Jaw - bite - teeth

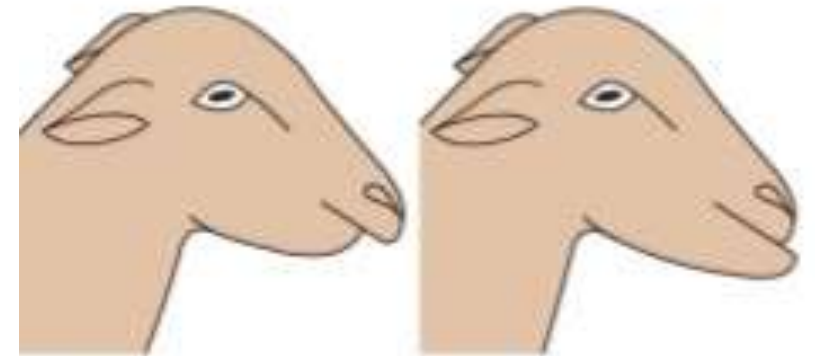
Source: Visual Sheep Scores  
Australian Wool Innovation



Normal



Slight defect  
1-3 mm



Severe defect  
>3 mm

Jaw defects are considered to be highly heritable (recessive – how many genes?).

# Reproductive soundness

## Teats and udders

- Udder health is particularly important when adding mature ewes to the flock.
- 1. Teats  
Number, size, and placement  
~~Supernumerary teats, teat defects~~
- 2. Udder  
Health, shape, support  
~~Scar tissue, loss of function, pendulous~~



# Conformation - shape

- Stature
- Volume
- Bone
- Muscling
- Condition



# Coat – fiber - color

## FLEECE CHARACTERISTICS



## COAT TYPE/SHEDDING



# Tips for developing ewe lamb replacements

- Sort replacement ewe lambs from market lambs and feed for more moderate growth.
  - Frame development is more important than fattening.
  - Fat deposition may be detrimental to mammary development.
- Ewe lambs should be targeted to reach about two-thirds of their body weight before being bred.
- Ewe lambs should be fed and managed separately from mature ewes until they are bred to produce their second lamb crop.
- Can pregnancy test ewe lambs and sell open ones.
- You often needs to save more replacements than you need.





Culling poor  
performing  
ewes

# Culling

- It is customary to cull ~15 percent of the flock each year.

Year	Percent culled
2001	18.3
2011	14.0

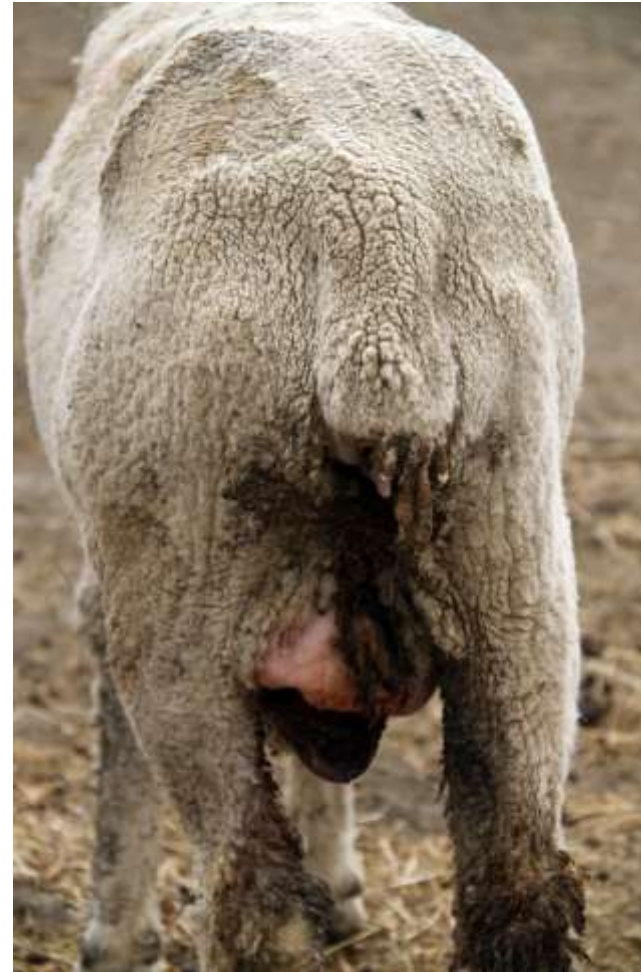
USDA APHIS National Animal Health Monitoring Service, April 2014



# Reasons for culling ewes among US sheep flocks

Primary reason for culling	% of sheep	% of sheep operations
<b>Age</b>	55.6	69.7
<b>Failure to lamb</b>	7.7	22.0
<b>Teeth problems</b>	7.6	8.0
<b>Hard bag</b>	7.1	24.1
<b>Mastitis</b>	6.7	20.9
<b>Poor mothering</b>	4.7	22.3
<b>Other</b>	3.7	7.6
<b>Chronic weight loss</b>	2.1	3.6
<b>Economic issues</b>	1.7	2.8
<b>Other illness</b>	1.2	2.4
<b>Single births</b>	1.1	3.9
<b>Other repro problems</b>	0.9	3.3

USDA APHIS National Animal Health Monitoring Service, April 2014



# Age is the primary reason for culling ewes.

- It is customary to cull ewes when they reach 5 to 6 years of age, especially in range flocks, where ewes cannot receive individual attention.
- Ewes tend to be most productive between the ages of 3 and 6; **on average, older ewes give birth to fewer lambs and produce less milk for their offspring.**
- Some ewes are productive for a longer period of time and should be retained.

Year	Average age at culling
2001	5.9
2011	6.3

USDA APHIS National Animal Health Monitoring Service, April 2014



## Health is another major reason for culling.

- Udder health
- Prolapses
- Hoof health
- Internal parasites
- Other



# Hard bag and mastitis have been identified as major reasons for culling ewes.

## HARD BAG

- Accumulation of fibrous tissue in udder.
- If both halves of udder are affected, is usually ovine progressive pneumonia (OPP, viral).
- At lambing, udder appears full and usually well-shaped.
- Little or no milk is produced.

## MASTITIS

- Infection and inflammation of udder
- One or both halves can be affected.
- Most commonly caused by a bacterial infection.
- Can be clinical or sub-clinical
- Severe infection results in bluebag

# Only ewes with sound, healthy udders should be retained in the flock.

## GOOD UDDERS

- Free from lumps, scar tissue, and fibrous material
- Two normal sized teats
- Equal sized halves
- Two functioning halves



## CULL

- Scar tissue
- Oversized teats
- Long pendulous udders
- Loss of any udder function; don't keep ewes with only one functioning side.

# Should you cull ewes that experiences prolapses?

**RECTAL**



**VAGINAL**

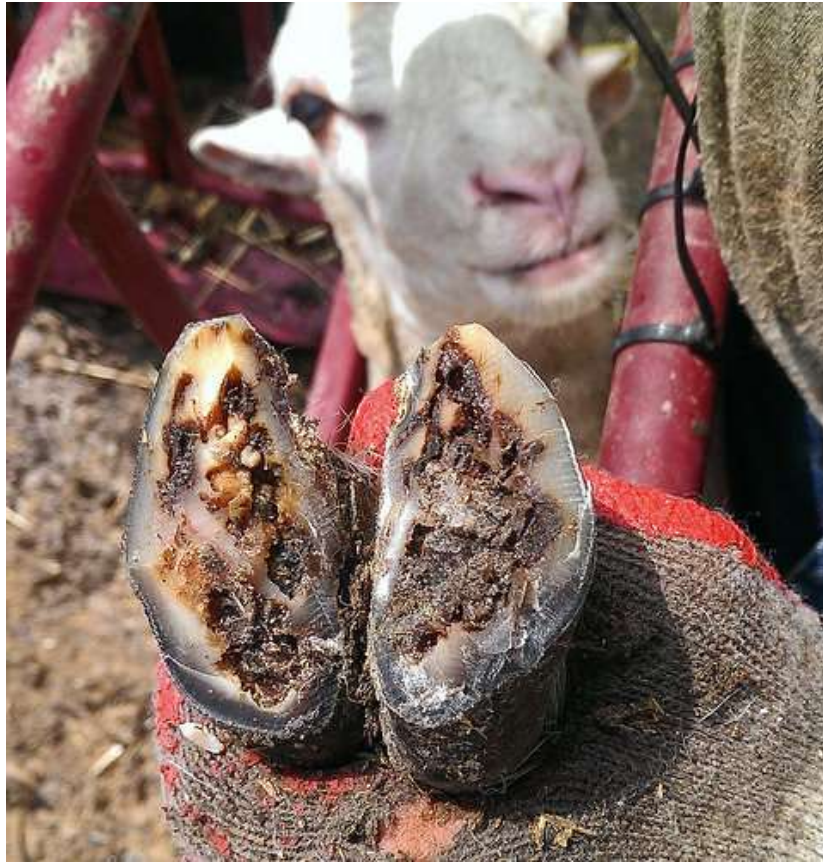


**UTERINE**



A prolapse is when structures fall out of their normal positions. There are many causes.

# Culling is the most powerful tool for dealing with foot rot.



- Cull ewes that are chronically infected with foot rot or scald.
- Cull ewes that fail to respond to treatment.
- Cull ewes that have excessive or abnormal hoof growth.
- To develop an easy care flock, cull ewes that require any hoof trimming.

In many production environments, internal parasites are one of the major obstacles to profitable production.



- Cull ewes that require frequent or regular deworming.
- To develop an easy care flock, cull ewes that require any deworming.
- To improve parasite resistance in your flock, cull ewes with the highest fecal egg counts.

## There may be other health issues which may necessitate culling of ewes.

- Ill thrift
- Unidentified weight loss
- Cannot maintain body condition
- Teeth problems
- Genetic defects
- Predisposition to disease
- Repeated health problems



# Some more reasons for culling

## POOR MOTHERING



**Cull ewes that reject one or more of their lambs**

## POOR LAMB VIGOR



**Cull ewes that give birth to weak lambs that are slow to get up and suck.**

# Should you cull ewes that require assistance at lambing? Maybe.

## **DYSTOCIA: many factors**

- Breed
- Sire breed
- Birth weight
- Gender
- Age of ewe
- Nutrition
- Over-eager shepherds
- Genetics
  - Low heritability (0.01-0.18)
  - Ringwomb may be heritable.



**If you want “easy care” sheep, cull any ewe that requires assistance at birthing.**

# Should you cull for single births?

## It depends.

- Everyone should strive to maximize lambing percentage relative to their environment and production system.
- Some production systems require higher lambing rates in order to be profitable.
- Single births are common among ewe lambs and preferred by many shepherds.
- Two single births in a row may be a standard for culling in some flocks.
- Single lambs of poor quality are another reason for culling.



# What about ewes in an accelerated lambing program?

- Failure to breed out-of-season
- Miss two breeding opportunities



You cannot make money with ewes that do not raise lambs.



Cull any ewe that does not wean a lamb. Do not make excuses.

# Performance can be used as a criteria for culling ewes

- Records can be used to rank ewes for productivity and identify those which should be culled.
- Pounds of lamb weaned is a composite trait that is a measure of fertility, prolificacy, mothering ability, milk production.
- Litter weight should be adjusted for sex of lambs and age of dam.
- Can determine efficiency by dividing litter weight by ewe weight.

Ewe ID	Age	# lambs born	# lambs weaned	Adjusted Litter weight*	Ratio	Ewe weight	Efficiency
12120	5	2	2	120	96.8	170	70.6
11087	6	1	1	90	72.5	160	56.3
14020	3	3	3	170	137.0	165	103.0
15017	2	3	2	140	112.9	145	96.6
16001	1	2	2	100	80.6	130	76.9

# Identifying cull ewes

- Identification and record keeping are tools that assist in identifying cull ewes.
- Ideally, all ewes are individually identified with ear tags.
- Cull ewes can also be ear tagged or ear notched for easy identification.



# Best Management Practices to Increase Your Lamb Crop

## United States Lamb Resource Center

**UNITED STATES LAMB RESOURCE CENTER**

**PRODUCTIVITY BEST PRACTICES**

*Increasing Your Lamb Crop Series*

### Culling Underperforming Ewes

#### Introduction

Lamb crop is one of the most important factors affecting profitability of a sheep enterprise. Increasing the lamb crop, as long as it is in balance with the environment and production system, should be the goal of every sheep producer.

Many factors affect lambing percentage, and management is a key contributor. Culling underperforming ewes is one of 12 best management practices that has been identified by the American sheep industry for improving lambing percentage.

However, unlike some of the other best management practices, such as breeding own lambs or pregnancy scanning, culling underperforming ewes is something all producers, regardless of flock size or production system, can and should do.

Culling underperforming ewes will reduce the cost of maintaining the flock. Underperforming ewes consume feed, take up space, and require labor, while producing less profit than their contemporaries; ewes, when culling the lame ewes. Thus, culling underperforming ewes is a way to help make sheep production more profitable, sustainable, and stable.

At the same time, overzealous culling is discouraged, as there are numerous costs associated with culling. The value of a cull ewe is considerably less than the value of the ewe lamb that is replacing her. There are also costs associated with developing own lambs for breeding. Depending upon the reason for culling, it may be more economical to retain a ewe and breed her to a terminal sire, such as for the production of market lambs.

In a sheep enterprise, it is customary to cull approximately 15% of the flock each year. In pasture or high producing flocks, the rate may be even higher. According to the National Animal Health Monitoring System (NAHMS), 14% of ewes were culled from the national flock in 2011, as compared to 10.3% in 2007.

Culling to retain a ewe (or ram) is determined from the breeding flock. There are many reasons to cull ewes, and the reasons will vary by farm or ranch. Not all flocks will have the same breeding objectives. Ewes that are profitable in some flocks may not be profitable in other flocks. Current economic conditions may weaken or strengthen culling standards.

#### How to calculate lamb crop

$$\text{Number of Lambs Sold} + \text{Retained} \\ + \text{Number of Ewes Expired} \\ = \text{Lamb Crop}$$

In a sheep enterprise, it is customary to cull approximately 15% of the flock each year.

#### Reasons for culling ewes among all US sheep flocks

Primary reason for culling	% of sheep	% of sheep operation
Age	35.6	69.7
Fallen to lamb	7.7	22.6
Tooth problems	2.8	6.0
Hard leg syndrome	2.8	24.1
Mastitis	6.7	20.9
Poor mothering	4.7	22.3
Other	3.7	7.6
Chronic weight loss	2.1	3.6
Economic issues	1.7	2.8
Other illness	1.2	2.4
Single births	1.1	3.9
Other reproductive problems	0.9	3.3
Total	100	

NSIP-APIS, National Animal Health Monitoring System, April 2014

www.lambresourcecenter.com

**PRODUCTIVITY BEST PRACTICES**

1. Accelerated lambing cycles
2. Breeding ewe lambs at 7-9 months
3. **Culling underperforming ewes**
4. Disease prevention and treatment
5. Manage for seasonal changes in reproduction
6. Match reproduction to environment
7. Optimal nutrition
8. Reduce lamb loss
9. Select for prolific genetics
10. Test for pregnancy status
11. Testing rams for breeding soundness
12. Use crossbreeding

This webinar was made possible with funding support from the Let's Grow Committee of the American Sheep Industry Association.



Thank you. Questions?

UNIVERSITY OF  
MARYLAND  
EXTENSION