# Maximizing Pounds of Lamb per Ewe



# Maximum vs. Optimal Production 'one size fits all' fits no-one





## **A Lot of Pieces**





# # Weaned







### **Factors**

- Number of lambs born
- Lamb Survivability

# # Lambs Born

- Factors
  - -Genetics
  - -Environment/Management

# # Lambs Born - Genetics

- Factors
  - -Breed
  - -Crossbreeding
  - -Selection Pressure



# # Lambs Born - Genetics

Breed

#### -Large breed differences in prolificacy

#### DIFFERENCES AMONG BREEDS OF SHEEP IN THE U.S. AND THEIR USE IN EFFICIENT SHEEP PRODUCTION SYSTEMS

D.L. Thomas - University of Wisconsin-Madison

		Number	Average	Prolificacy relative
Rank	Breed	of studies	prolificacy	to Suffolk
1	Romanov	1	3.40	1.99
2	Finnsheep	9	2.56	1.50
3	Booroola Merino (Fec <sup>B+</sup> )	1	2.19	1.28
4	St. Croix	2	2.13	1.25
5	Barbados	3	1.92	1.12
6	Clun Forest	1	1.83	1.07
7	Polypay	3	1.80	1.05
8	Suffolk	13	1.71	1.00
9	North Country Cheviot	1	1.70	.99
10	Dorset	7	1.65	.96
11	Border Leicester	1	1.65	.96
12	Hampshire	5	1.62	.95
13	Targhee	13	1.56	.91
14	Columbia	6	1.53	.89
15	Rambouillet	10	1.52	.89
16	Corriedale	3	1.51	.88
17	Coopworth	1	1.50	.88
18	Navajo	2	1.40	.82
19	Romney	1	1.32	.77

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# # Lambs Born - Crossbreeding

#### Table 5. Average Heterosis Effects in the Crossbred Ewe<sup>a</sup>

Trait	Level of heterosis (%)
Fertility	
Prolificacy	
Body weight	5.0
Fleece weight	5.0
Lamb birth weight	5.1
Lamb weaning weight	6,3
Lamb survival: birth to weaning	
Lambs born per ewe exposed	
Lambs reared per ewe exposed	
Weight of lamb weaned per ewe exposed.	
* From the review: Nitter, G. 1978. "Breed	l Utilization for Meat
Production in Sheep." Animal Breeding A	Abstracts. 46:131-143.

# Use of two way cross to produce maternal replacement ewes

### Trait – Lambing rate

- Targhee
  - 156% lambcrop (Thomas)
- Booroola Merino (FecB+)
  - 219% lambcrop (Thomas)

# Use of two way cross to produce maternal replacement ewes

### Trait – Lambing rate

Expected lambing rate of progeny produced

- = (Booroola + Targhee)/2 = 187.5%
- = 187.5% x 1.115 (heterosis) = 209%

# # Lambs Born - Genetics

- Selection Pressure
  - -Select for animals better than the breed average.



# Use of two way cross to produce maternal replacement ewes

### Trait – Lambing rate

- Targhee (NSIP)
  - 156% lambcrop (Thomas)
  - 156% x 1.09 (NSIP) = 170%
- Booroola Merino (FecB+)
  - 219% lambcrop (Thomas)

# Use of two way cross to produce maternal replacement ewes

### Trait – Lambing rate

Expected lambing rate of progeny produced

- = (Booroola + NSIP Targhee)/2 = 187.5%
- = 193% x 1.115 (heterosis) = 215%

#### **Lambing Rate**



- Factors
  - -Time of year (day length)
  - -Temperature
  - -Nutrition
  - -Parturition & Lactation
  - -Diseases & Parasites

# Time of year (day length)

- Ovulation rates lowest in months of May, June, & July. (longest days)
- Lambing rates potentially 29%
  lower than ewes bred in fall.

## **Temperature**

- -Major effect on embryo survival
  - Most effect during first 8 days following breeding.
  - Excessive ewe physical activity and excessively fat ewes increase effects of temperature.

## Nutrition of ewe

- Poor body condition score has negative effect on lambing rate.
- Ewes should be maintained in moderate to good body condition score and may show an increase in lambing rate when "flushed" prior to and during breeding.

## Parturition & Lactation

- Ability to rebreed during lactation is partially due to season.
- Best success is following early weaning at 45-60 days during the normal fall breeding season.

## **Diseases & Parasites**

- Diseases and or heavy parasite infection can reduce body condition score of ewes and affect lambing rate similar to improper nutrition.
- Drenching and moving to clean pasture just prior to breeding can increase lambing rate like "flushing".

# Lamb Survivability

- Factors
  - Genetics
  - Management

# Lamb Survivability - Genetics

#### Crossbreeding

Table 4. Average Heterosis Effects in the Crossbred Lamb<sup>a</sup>

Trait	Level of heterosis (%)
Birth weight	3.2
Weaning weight	5.0
Preweaning daily gain	5.3
Postweaning daily gain	6.6
Yearling weight	5.2
Conception rate	2.6
Prolificacy of the dam	2.8
Survival: birth to weaning	
Carcass traits	approximately 0
Lambs born per ewe exposed <sup>b</sup>	
Lambs reared per ewe exposed <sup>b</sup>	
Weight of lamb weated per ewe exposed	l <sup>b</sup> 17.8

\* From the review: Nitter, G. 1978. "Breed Utilization for Meat

#### Heterosis greatest for traits with low heritability!

bred lambs.

# Maximize Heterosis

- Breeds A and B crossed to produce F1 crossbred ewes (AB).
- F1 ewes (AB) crossed on ram of third breed (C) to produce lambs.
  - (AB)xC = 1/2C 1/4A 1/4B
  - Most times Breed C would be from a terminal sire breed.
  - C would be a maternal sire if replacement ewes desired.

# Lamb Survivability

#### Management

- Shed Lambing
- Ultrasound for pregnancy and fetal number
- Artificial rearing

# Lamb Survivability - Management

### Shed Lambing

- Decrease lamb loss in first 24 hours.
- Better nutritional management of ewe and lamb.
- Decreased predator loss.

# Lamb Survivability - Management

#### Ultrasound for pregnancy and fetal number

- Identify ewes with singles.
- Wet graft extra lambs to single bearing ewes at time of lambing.

# Lamb Survivability - Management

### **Artificial Rearing**

- Should be rare if grafting is successful.
- Lambs should feed themselves on a free-choice basis.
  - to minimize labor
  - maximize the amount of milk consumed

# Lamb Wgt.







### **Factors**

- Genetics
- Management

# Lamb Wgt. - Genetics

- Factors
  - -Breed
  - -Crossbreeding
  - -Selection Pressure



Evaluation of Columbia, USMARC-Composite, Suffolk, and Texel rams as terminal sires in an extensive rangeland production system: I. Ewe productivity and crossbred lamb survival and preweaning growth

T. D. Leeds,\*3 D. R. Notter,† K. A. Leymaster,‡ M. R. Mousel,\* and G. S. Lewis\*

\*USDA, ARS, U.S. Sheep Experiment Station, Dubois, ID 83423; †Department of Animal and Poultry Sciences, Virginia Tech, Blacksburg 24061; and ‡USDA, ARS, U.S. Meat Animal Research Center, Clay Center, NE 68933

Body weights at birth, weaning, and 90 days postweaning for lambs sired by Columbia, Composite, Suffolk, and Texel rams. Values within shaded columns are birth weights and gains during the pre- and postweaning periods





# Lamb Wgt. - Genetics

- Selection Pressure
  - -Select for animals better than the breed average.

#### Weaning weight EBVs for Suffolk rams by source flock



#### NSIP Genetic Trend for Weaning Weight EBVs (kg) in Suffolk Sheep



# Lamb Wgt. - Management

- Factors
  - -Creep Feeding
  - -Use of terminal sires
  - -Early weaning

# # Lambings



# # Lambings





- Breeds
- Management

#### General Classification of U.S. Breeds of Sheep – More Common Breeds (Thomas)

Breed	Country of origin	Wool type	Hardiness⁵	Mature size <sup>c</sup>	Growth rate <sup>b</sup>	Prolificacy <sup>b</sup>	Breeding season <sup>d</sup>	Avg. fiber diameter, microns	Ewe grease fleece wt., lb.
Border Leicester	England	Long	M-	L-	M+	M+	S	30-38	8-12
Cheviot	Scotland	Medium	M+	S+	L+	М	S	26-33	5-8
Columbia	U.S.	Medium	M+	L	Н	M-	М	23-30	9-14
Coopworth	New Zealand	Long	Μ	М	Μ	M+	S	30-36	8-12
Corriedale	New Zealand	Medium	M+	М	Μ	M-	Μ	24-31	9-14
Dorset	England	Medium	M-	М	Μ	М	L	27-33	5-8
Finnsheep	Finland	Medium/Long	L+	S+	L+	H+	Le	24-31	3-7
Hampshire	England	Medium	M-	L	Н	М	М	25-33	5-8
Montadale	U.S.	Medium	М	L-	M+	Μ	М	25-30	5-9
Oxford	England	Medium	Μ	L	H-	Μ	S	30-34	5-8
Polypay	U.S.	Medium	М	M+	M+	н-	L	24-33	6-10
Rambouillet	France/German y	Fine	Н	L-	M+	M-	<u>ـ</u>	19-24	9-14
Romney	England	Long	M-	M+	М	L	S	32-39	8-14
Shropshire	England	Medium	M-	L-	M+	М	М	25-33	5-8
Southdown	England	Medium	M-	M-	L+	M-	М	24-29	5-8
Suffolk	England	Medium	L	L+	H+	M+	М	26-33	3-7
Targhee	U.S.	Medium/fine	M+	L-	M+	М		21-25	8-14



# CIDRS



## Maximum Lbs. Lamb Weaned





## Questions



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