

Maximizing Pounds of Lamb per Ewe



Maximum vs. Optimal Production

**'one size fits all' fits
no-one**

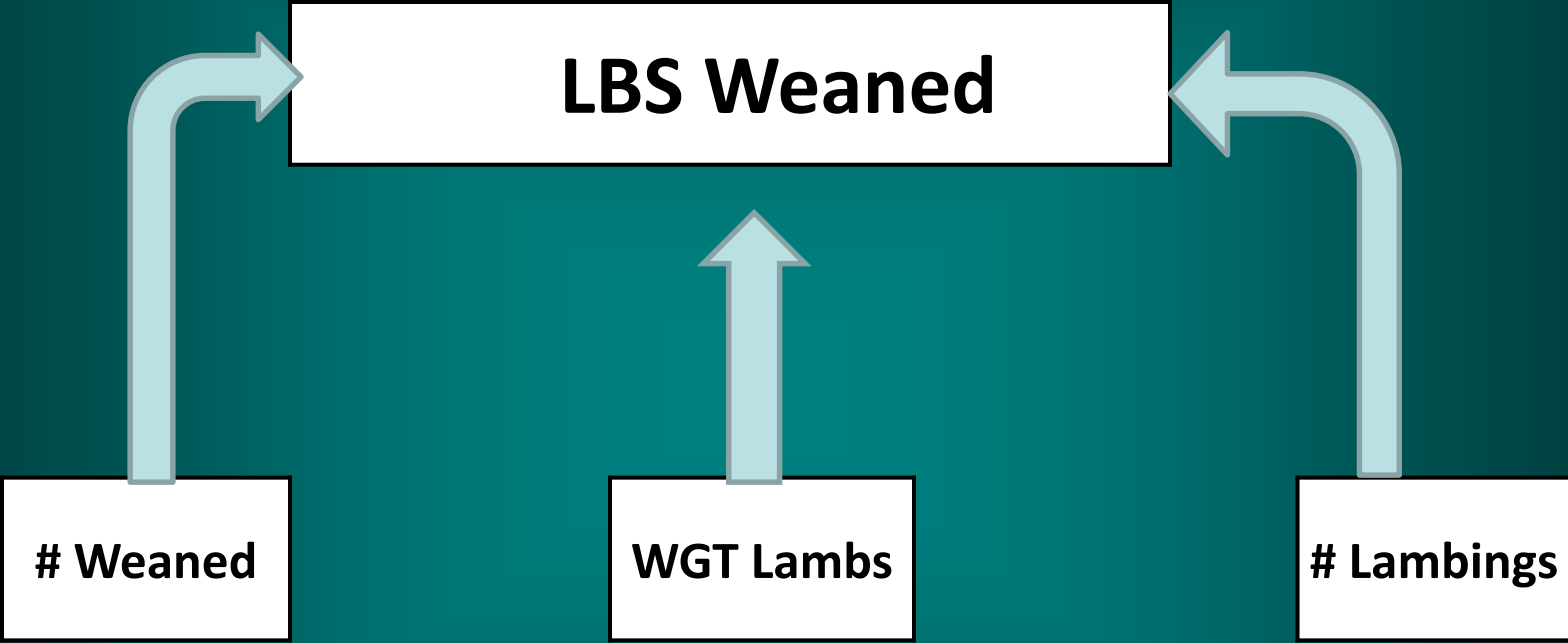




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A Lot of Pieces





Weaned



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

Rank	Breed	Number of studies	Average prolificacy	Prolificacy relative to Suffolk
1	Romanov	1	3.40	1.99
2	Finnsheep	9	2.56	1.50
3	Booroola Merino (Fec ^{B+})	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^a

<u>Trait</u>	<u>Level of heterosis (%)</u>
Fertility	8.7
Prolificacy	3.2
Body weight	5.0
Fleece weight.	5.0
Lamb birth weight	5.1
Lamb weaning weight	6.3
Lamb survival: birth to weaning.	2.7
Lambs born per ewe exposed	11.5
Lambs reared per ewe exposed.	14.7
Weight of lamb weaned per ewe exposed	18.0

^a From the review: Nitter, G. 1978. "Breed Utilization for Meat Production in Sheep." *Animal Breeding 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

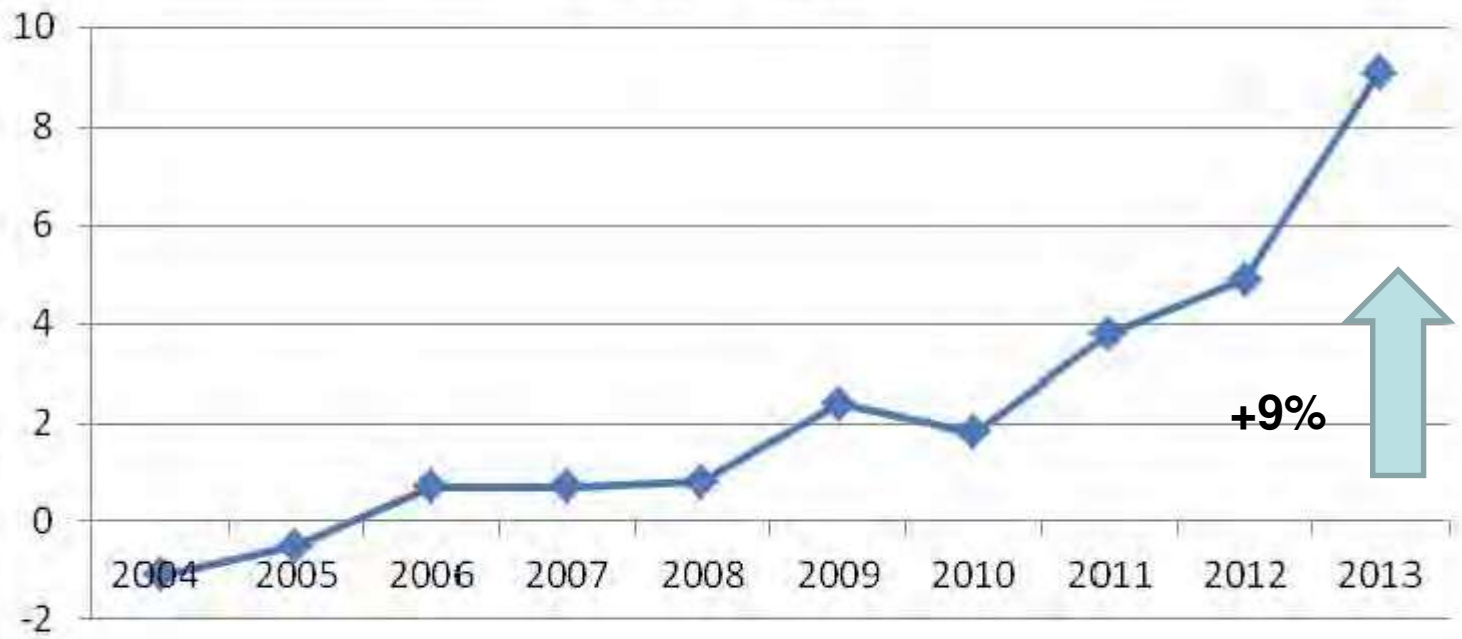
Trait – Lambing rate

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.

Targhee Breed: Number of Lambs Born EBVs NSIP AVG



Use of two way cross to produce maternal replacement ewes

Trait – Lambing rate

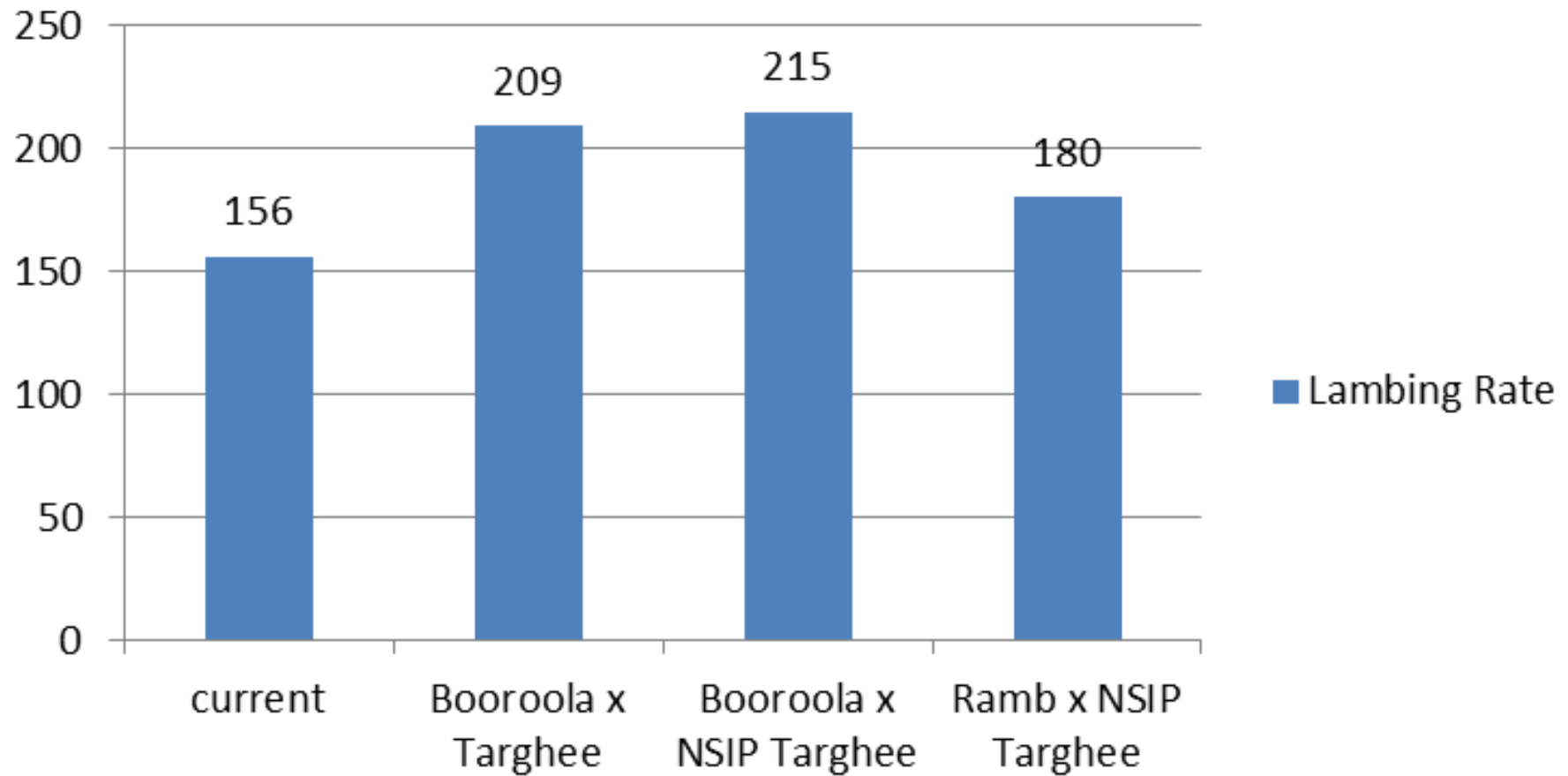
- Targhee (NSIP)
 - 156% lambcrop (Thomas)
 - $156\% \times 1.09 \text{ (NSIP)} = 170\%$
- Booroola Merino (FecB+)
 - 219% lambcrop (Thomas)

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



Lambs Born — Environment/Management

- Factors

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

Lambs Born - Environment/Management

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.

Lambs Born - Environment/Management

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.

Lambs Born - Environment/Management

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.

Lambs Born - Environment/Management

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.

Lambs Born - Environment/Management

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^a

<u>Trait</u>	<u>Level of heterosis (%)</u>
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	9.8
Carcass traits	approximately 0
Lambs born per ewe exposed ^b	5.3
Lambs reared per ewe exposed ^b	15.2
Weight of lamb weaned per ewe exposed ^b	17.8

^a 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.
 - $(AB) \times C = 1/2C \ 1/4A \ 1/4B$
 - 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.



Lamb Wgt.



Factors

- Genetics
- Management

Lamb Wgt. - Genetics

- Factors
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 - Selection Pressure

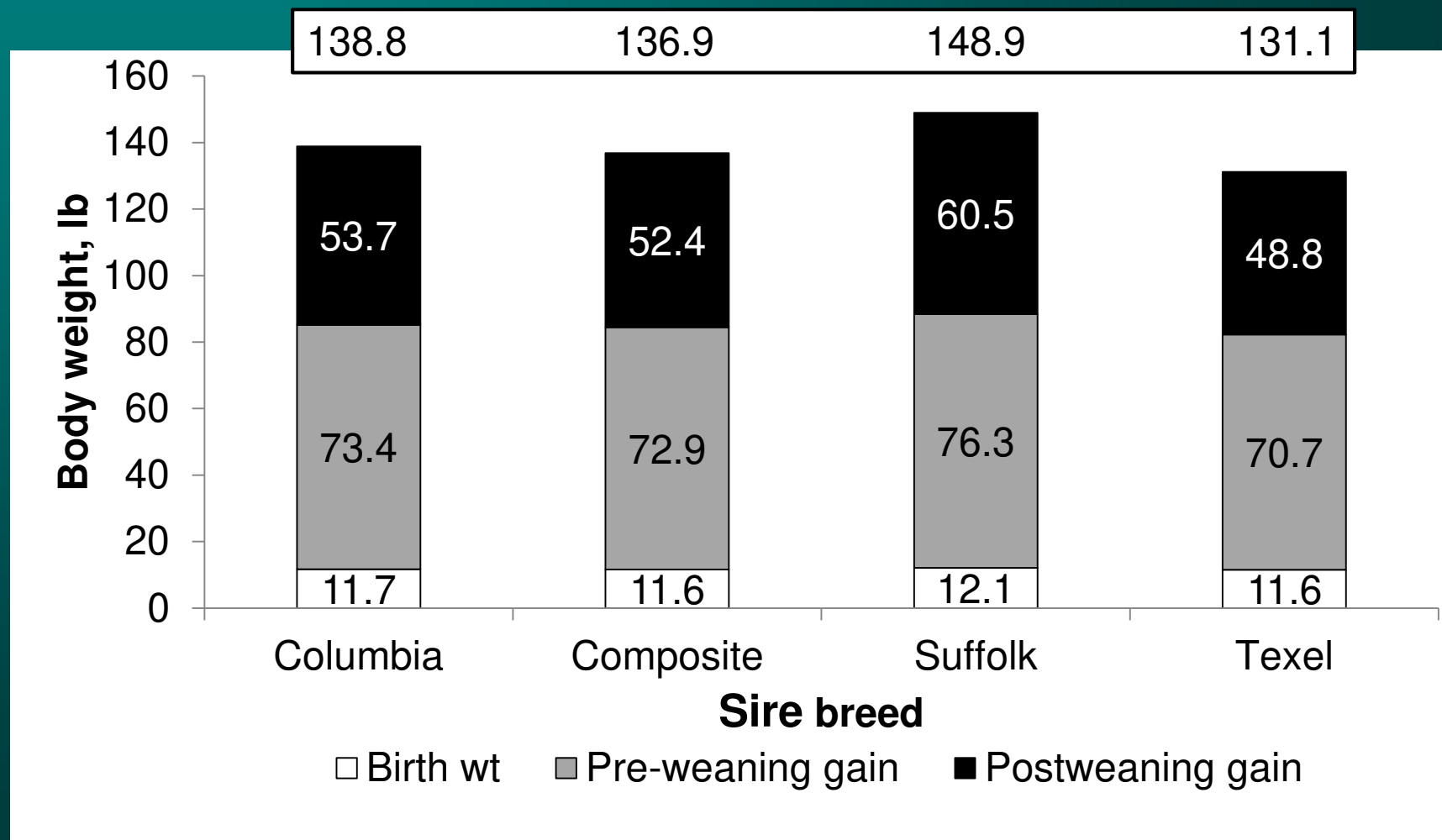


Evaluation of Columbia, USMARC-Composite, Suffolk, and Texel rams as terminal sires in an extensive rangeland production system: I. Ewe productivity and crossbred lamb survival and preweaning growth

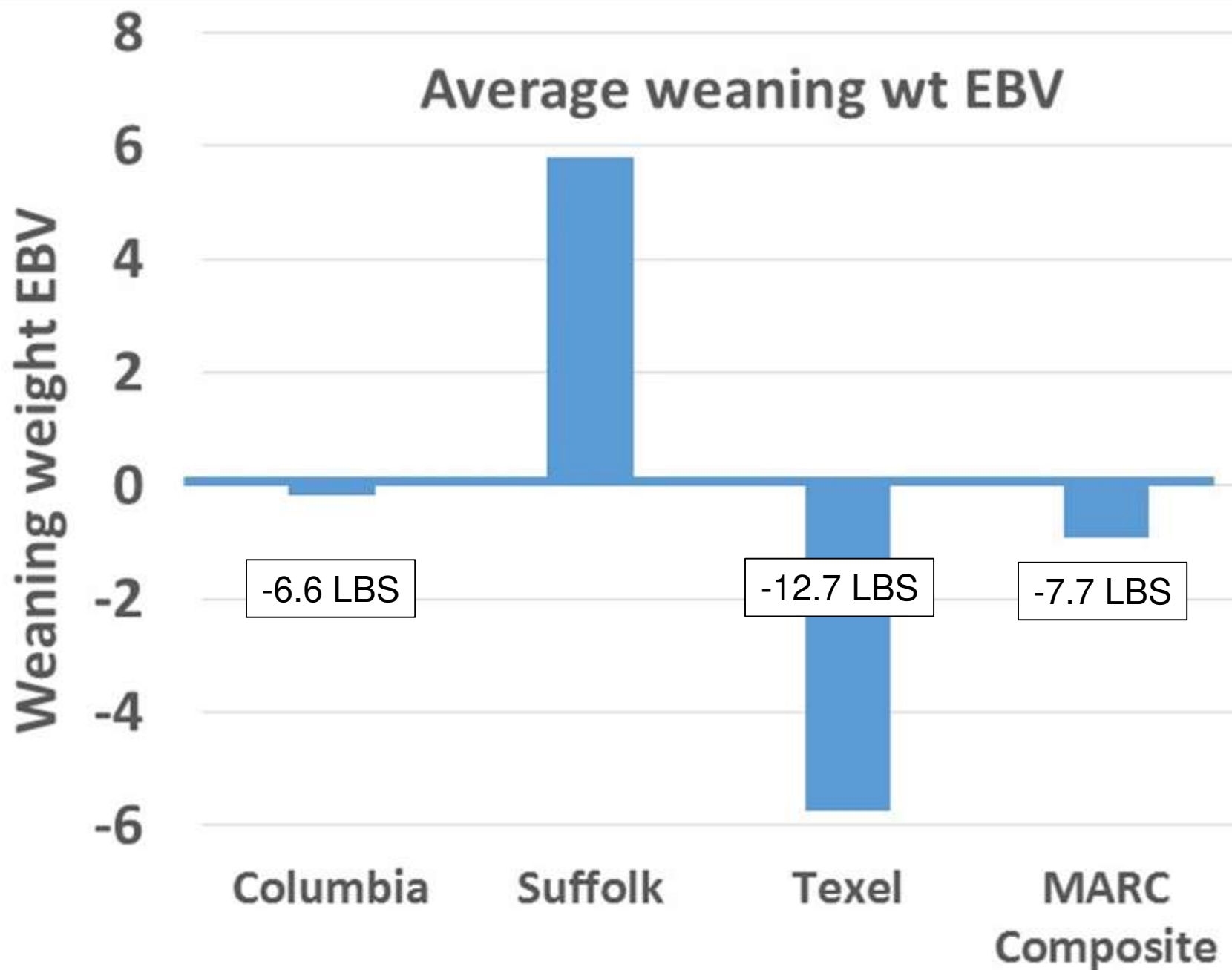
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*USDA, ARS, U.S. Sheep Experiment Station, Dubois, ID 83423; †Department of Animal and Poultry Sciences, Virginia Tech, Blacksburg 24061; and ‡USDA, ARS, U.S. Meat Animal Research Center, Clay Center, NE 68933

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



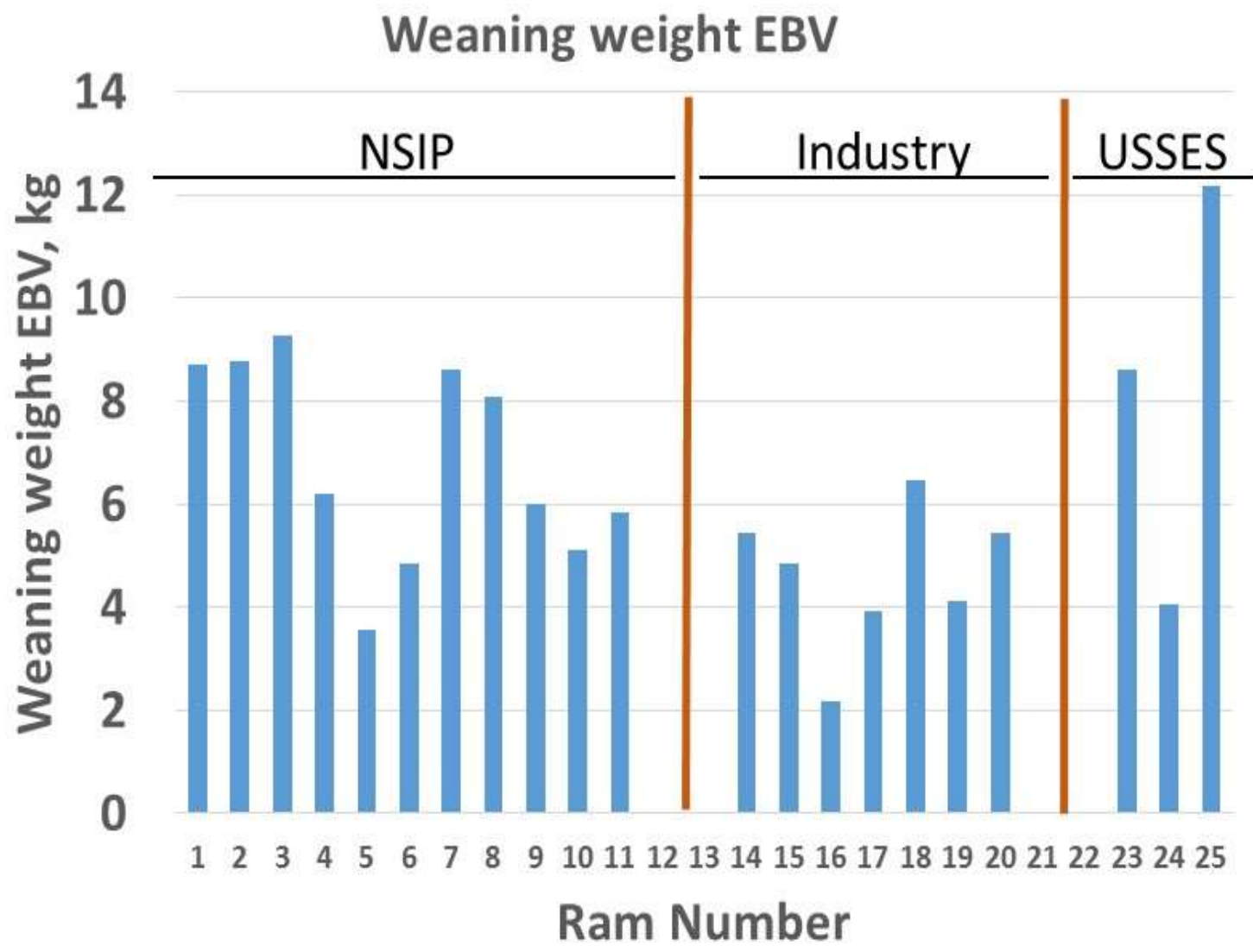
Average weaning wt EBV



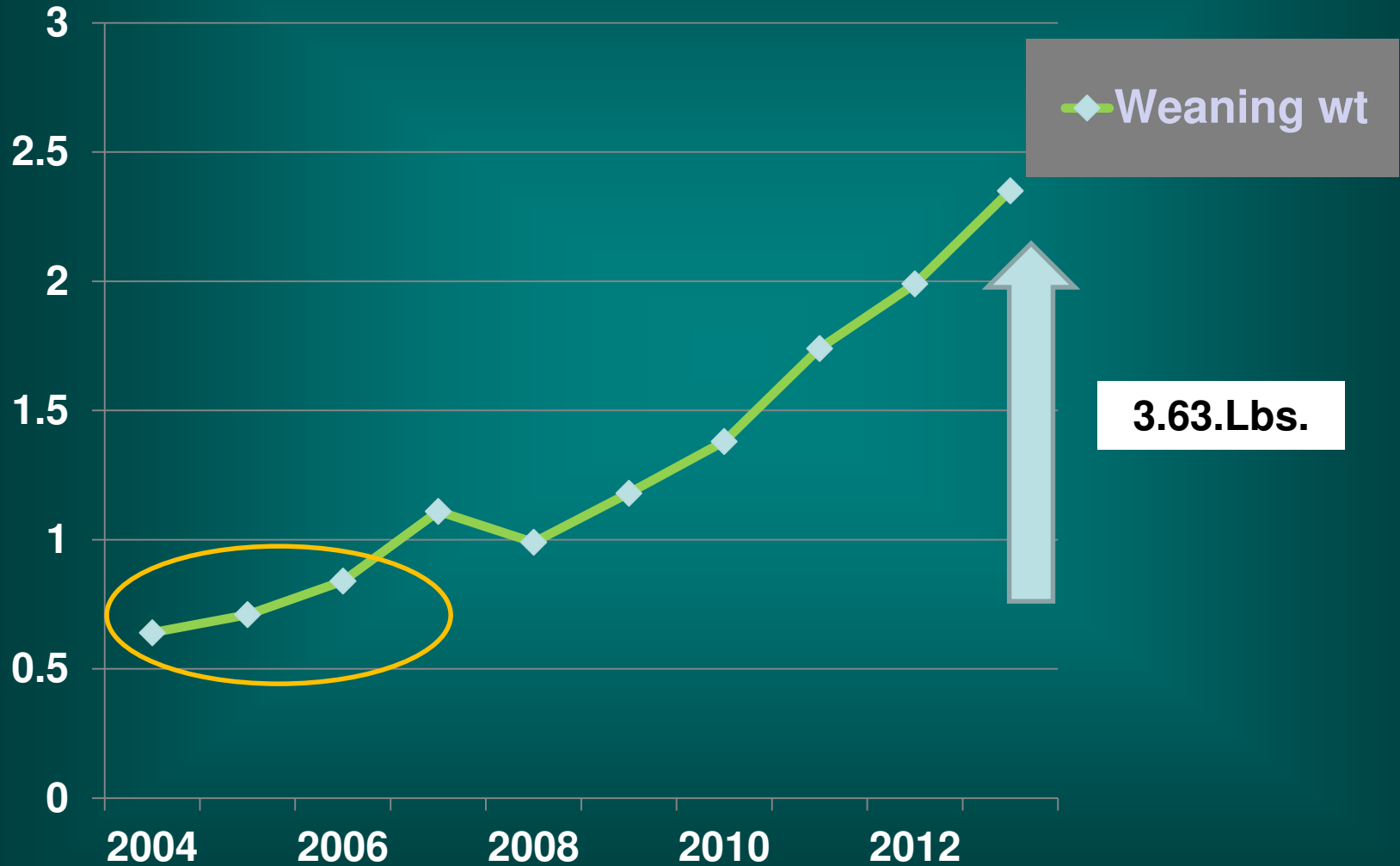
Lamb Wgt. - Genetics

- 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

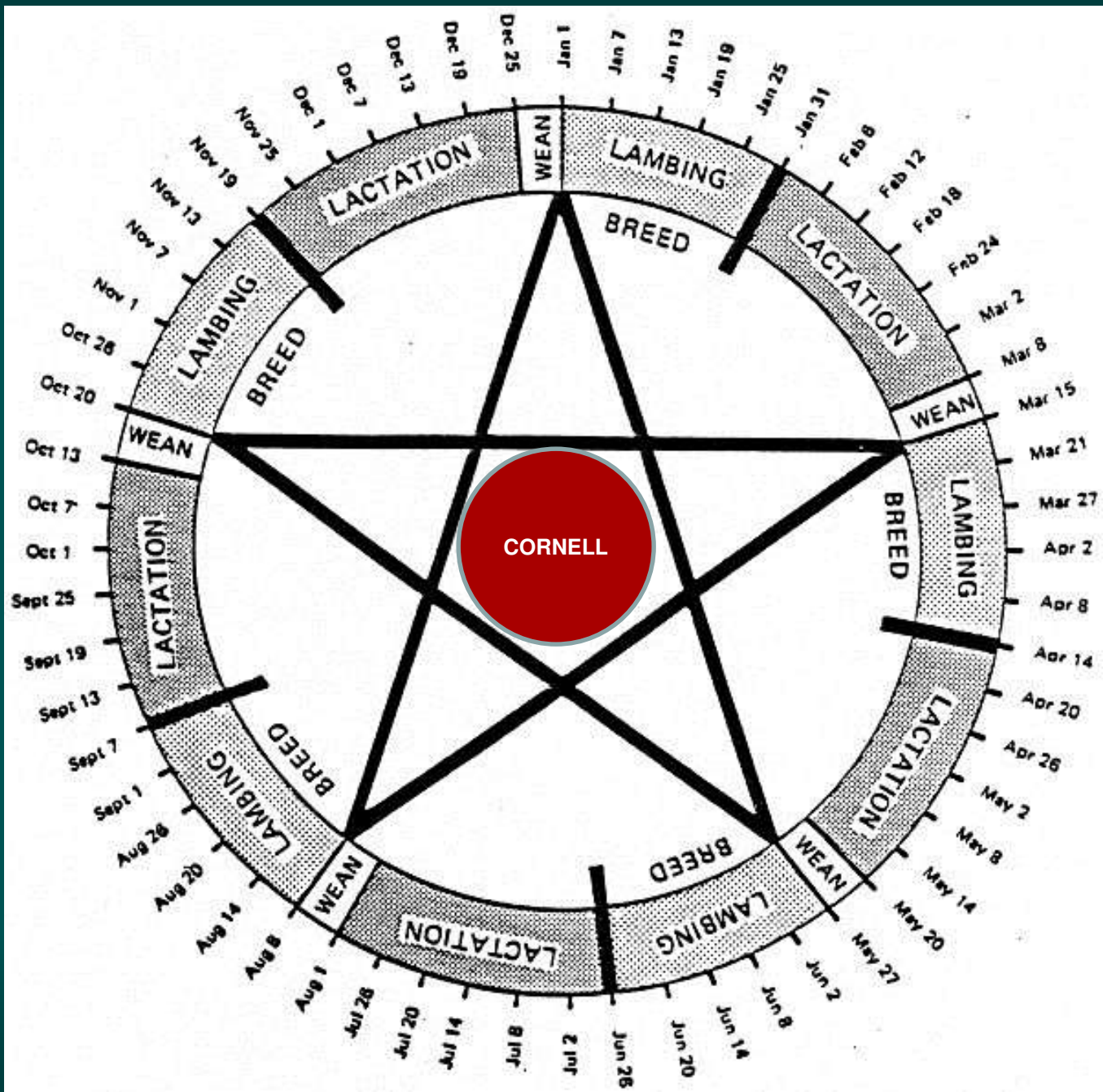


Factors

- Breeds
- Management

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

Breed	Country of origin	Wool type	Hardiness ^b	Mature size ^c	Growth rate ^b	Prolificacy ^b	Breeding season ^d	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+	M	S	26-33	5-8
Columbia	U.S.	Medium	M+	L	H	M-	M	23-30	9-14
Coopworth	New Zealand	Long	M	M	M	M+	S	30-36	8-12
Corriedale	New Zealand	Medium	M+	M	M	M-	M	24-31	9-14
Dorset	England	Medium	M-	M	M	M	L	27-33	5-8
Finnsheep	Finland	Medium/Long	L+	S+	L+	H+	L ^e	24-31	3-7
Hampshire	England	Medium	M-	L	H	M	M	25-33	5-8
Montadale	U.S.	Medium	M	L-	M+	M	M	25-30	5-9
Oxford	England	Medium	M	L	H-	M	S	30-34	5-8
Polypay	U.S.	Medium	M	M+	M+	H-	L	24-33	6-10
Rambouillet	France/Germany	Fine	H	L-	M+	M-	L	19-24	9-14
Romney	England	Long	M-	M+	M	L	S	32-39	8-14
Shropshire	England	Medium	M-	L-	M+	M	M	25-33	5-8
Southdown	England	Medium	M-	M-	L+	M-	M	24-29	5-8
Suffolk	England	Medium	L	L+	H+	M+	M	26-33	3-7
Targhee	U.S.	Medium/fine	M+	L-	M+	M	L	21-25	8-14



CIDRS



Maximum Lbs. Lamb Weaned



Weaned



Lamb Wgt.



Lambings



**SIZE
DOESN'T
MATTER,
FIT DOES**

Questions



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