Ram Selection -- Why Use Genetic Records

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What are EPD's

- EPD = Expected Progeny Difference
  - A prediction of how the offspring of an individual will perform
  - Estimate of an animals genetic value
    - Family performance
    - Individual performance
    - Offspring performance

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How EPD's are used?

EPD Example: Weaning Weight EPD values

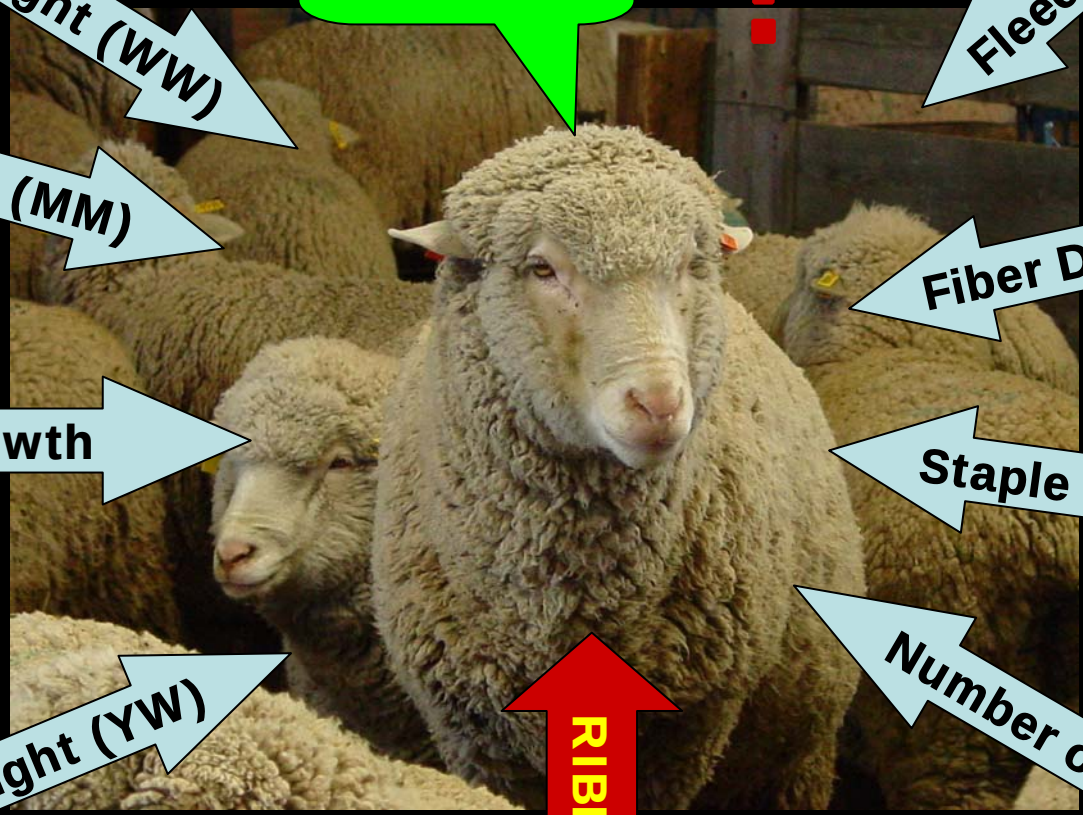
Ram #1	- 2.0
Ram #2	+ 3.0
Difference	+5.0 lbs

Ram #2 is expected to have lambs 5 lbs heavier than Ram #1

How EPD's are used?

	TOP	BASE	BOTTOM
WW	94	89	86
YW	170	160	153
FW	9.5	8.6	8.1
FW	9.5	8.6	8.1
SL	3.7	3.4	3.2
NLB	1.98	1.74	1.59

Total Confusion



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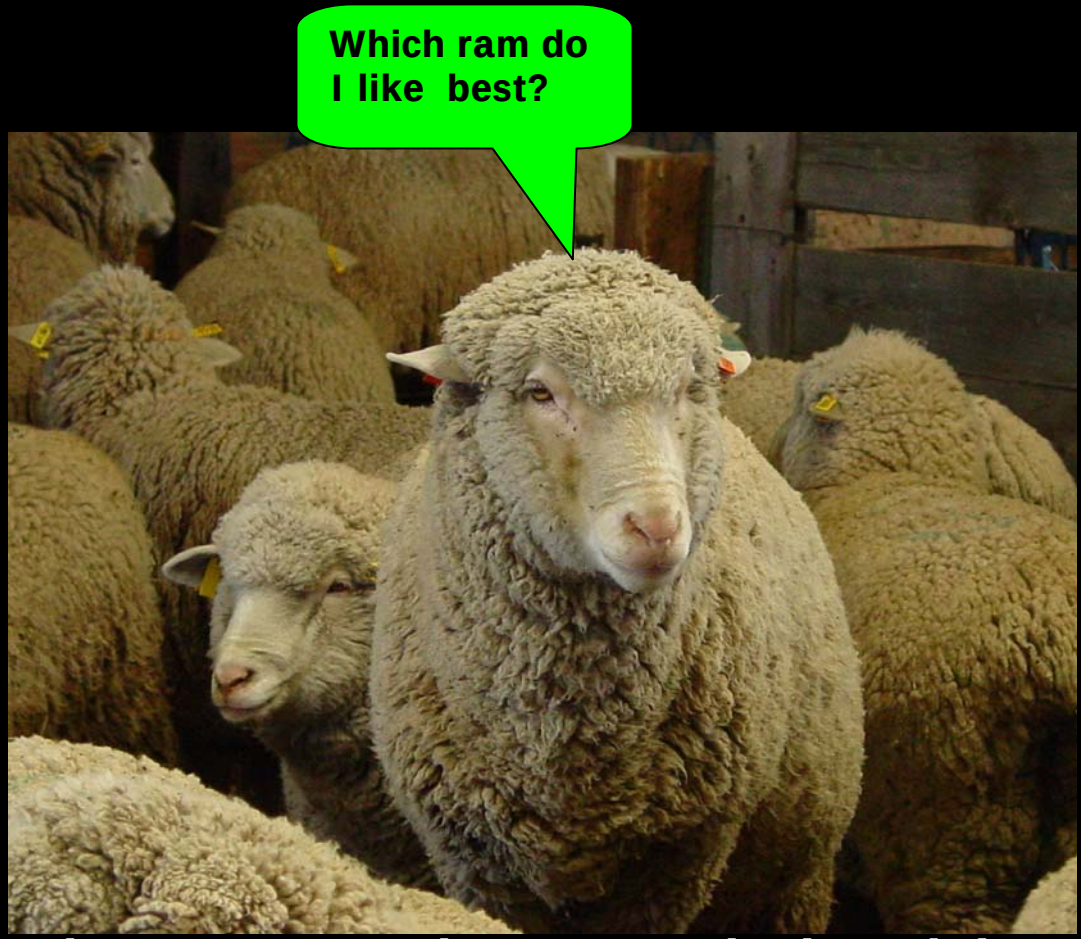
Single Trait Selection – independent culling levels



Allows for maximum progress in any one single trait but may have unwanted effects on other traits.

Typical EPD sheet for a set of rams

EPD's for different performance traits

Ram ID	WW	MM	YW	FW	FD	SL	LC
Tag 1	5.0	2.0	10.0	0.2	-0.4	0.00	4.0
Tag 2	1.2	3.0	2.0	0.2	-0.1	0.02	4.5
Tag 3	3.5	2.5	5.0	0.2	-0.2	0.01	4.5
Tag 4	1.0	0.5	2.0	0.2	-0.2	0.01	10.5

Profitability Index

Production weighting for component traits.

- ✓ **Heritability.**
- ✓ **Genetic and phenotypic correlations among traits.**
- ✓ **Variability in population.**

Relative economic weightings.

- ✓ **Increased income from increased production.**
- ✓ **Increased cost of increased production.**

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Example: If weaning weight increased by one lbs. from selection

Income from market lambs

Expense from

- extra feed
- larger yearling ewes
- more feed for heaver adults

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Angus Productions Inc.

- ✓ Weaned Calf Value ($W)
- ✓ Feedlot Value ($F)
- ✓ Grid Value ($G)
- ✓ Beef Value ($B)

Production					Maternal				Carcass			Ultrasound			$Values			
CED	BW	WW	YH	SC	CEM	MW	$EN	CW	Marb	RE	Fat	IMF	RE	Fat	$W	$F	$G	$B
+13	-2.4	+62	+1.2	+1.62	+13	+112	+27.49	+32	+.67	+.64	-.055	+.54	+.78	-.033	+33.22	+47.99	+29.09	+50.61
+12	-1.7	+59	+1.1	+1.41	+12	+97	+24.26	+27	+.59	+.58	-.048	+.46	+.70	-.028	+31.76	+43.51	+27.30	+48.35
+12	-1.3	+57	+1.0	+1.31	+12	+89	+22.23	+25	+.55	+.53	-.045	+.42	+.65	-.025	+30.89	+40.35	+26.04	+46.72
+11	-1.1	+55	+1.0	+1.22	+11	+84	+20.96	+24	+.52	+.48	-.041	+.38	+.61	-.023	+30.27	+38.49	+25.10	+45.63
			+.9	+1.17	+11	+81	+19.94	+22	+.48	+.46	-.038	+.36	+.58	-.021	+29.84	+36.98	+24.40	+44.71

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American Simmental Association

- ✓ All-Purpose Index (API)
- ✓ Terminal-Sire Index (TI)

Fall 2006 Purebred Simmental Percentile Table

Calving Ease	Birth Wt	Weaning Wt	Yrlng Wt	Matern l C Ease	Milk	Matern l Wn Wt	Stay	Carc ass Wt	Yield Grd	Mrblng	Back Fat	RbEye Area	WBS F	API ($)	TI ($)
12.5	-2.1	50.8	87.3	8.0	15.1	33.7	29.9	16.3	-0.16	0.31	-0.03	0.42	-0.49	117	70
11.7	-1.6	48.7	83.9	7.3	13.9	32.4	28.9	14.0	-0.14	0.28	-0.02	0.37	-0.44	113	69
11.2	-1.3	47.4	81.8	6.9	13.2	31.5	28.2	12.6	-0.13	0.26	-0.02	0.35	-0.41	111	68
10.8	-1.1	46.4	80.2	6.5	12.6	30.8	27.7	11.5	-0.12	0.25	-0.02	0.32	-0.39	110	68
10.5	-0.9	45.6	78.9	6.2	12.2	30.3	27.3	10.7	-0.12	0.24	-0.02	0.31	-0.37	109	67


AHA Launches
$Profit Indexes
LIMOUSIN
EXPECTED
DIFFERENCES
AICA
TERMINAL
SIRE
PROFITABILITY
INDEX
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Western Range

Profitability Index

INDEX		WW	MM	YW	FW	FD	PLC
Weight	Forage cost						
Discount	High	1	.18	-.70	1.89	-.48	.35
Discount	Low	1	.26	-.26	1.92	-.47	.36
No Discount	High	1	.36	-.40	1.14	-.30	.19
No Discount	Low	1	.41	-.17	1.18	-.29	.20
		+ + +	+	- -	+	-	+ +

Farm Flock

Profitability Index

Trait	Relative Weight
Weaning Weight	+ + +
Yearling Weight	- -
Maternal Milk	+
Fleece Weight	+
Fiber Diameter	-
Staple Length	(0)
Lamb Crop	+ +

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Bigger sheep have bigger lambs

=

Top 6 rams in Sire Summary for WW were in top 10 for YW

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Genetically, we went from dwarfs to giants in just 30 years.

But that's just cows

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Have we done the wrong thing by selecting for weaning weight / mature body size???

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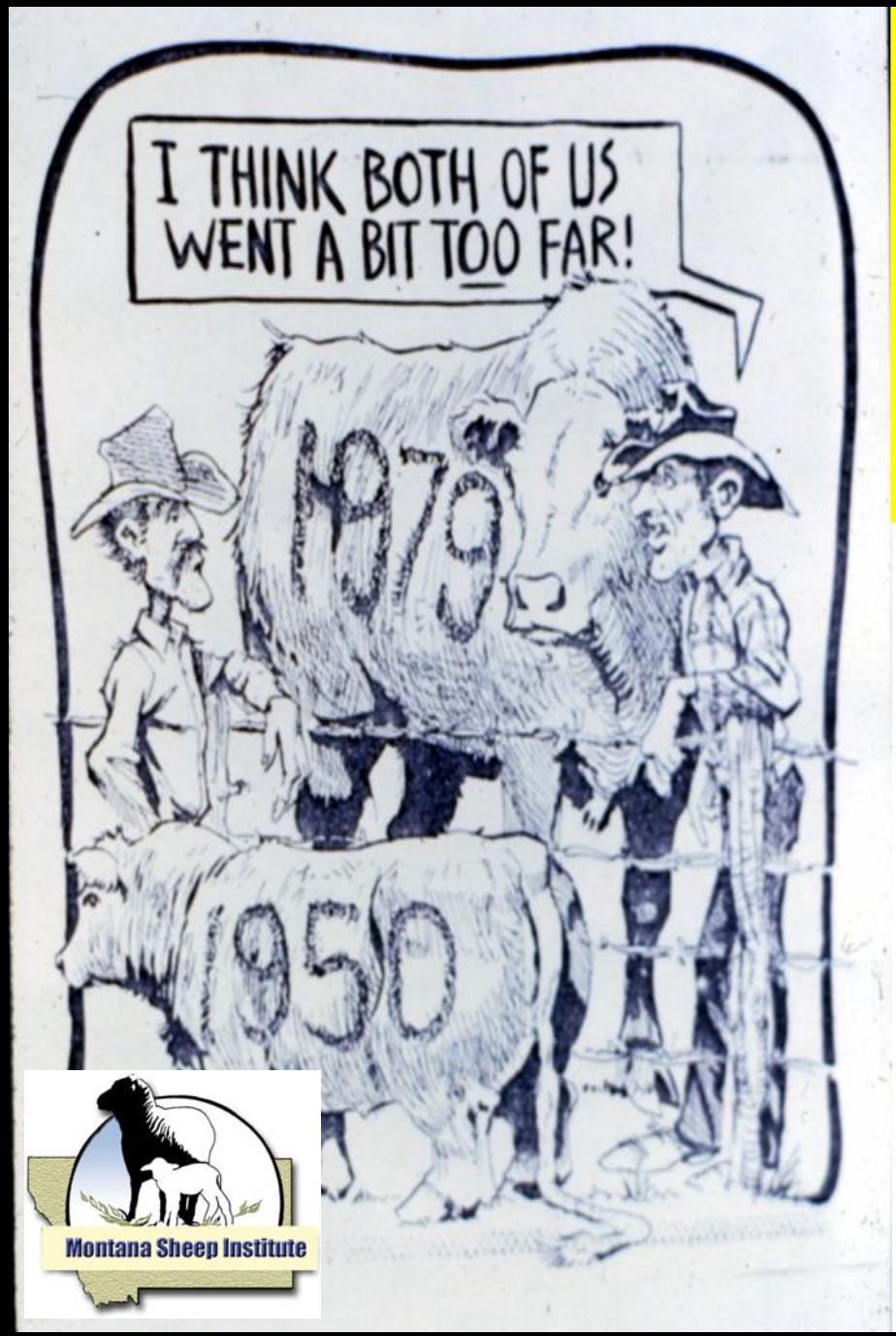
When is bigger to big

Bigger sheep eat more

Research indicates that we getting close to that point



Genetically, we went from dwarfs to giants in just 30 years.

The future will answer that question

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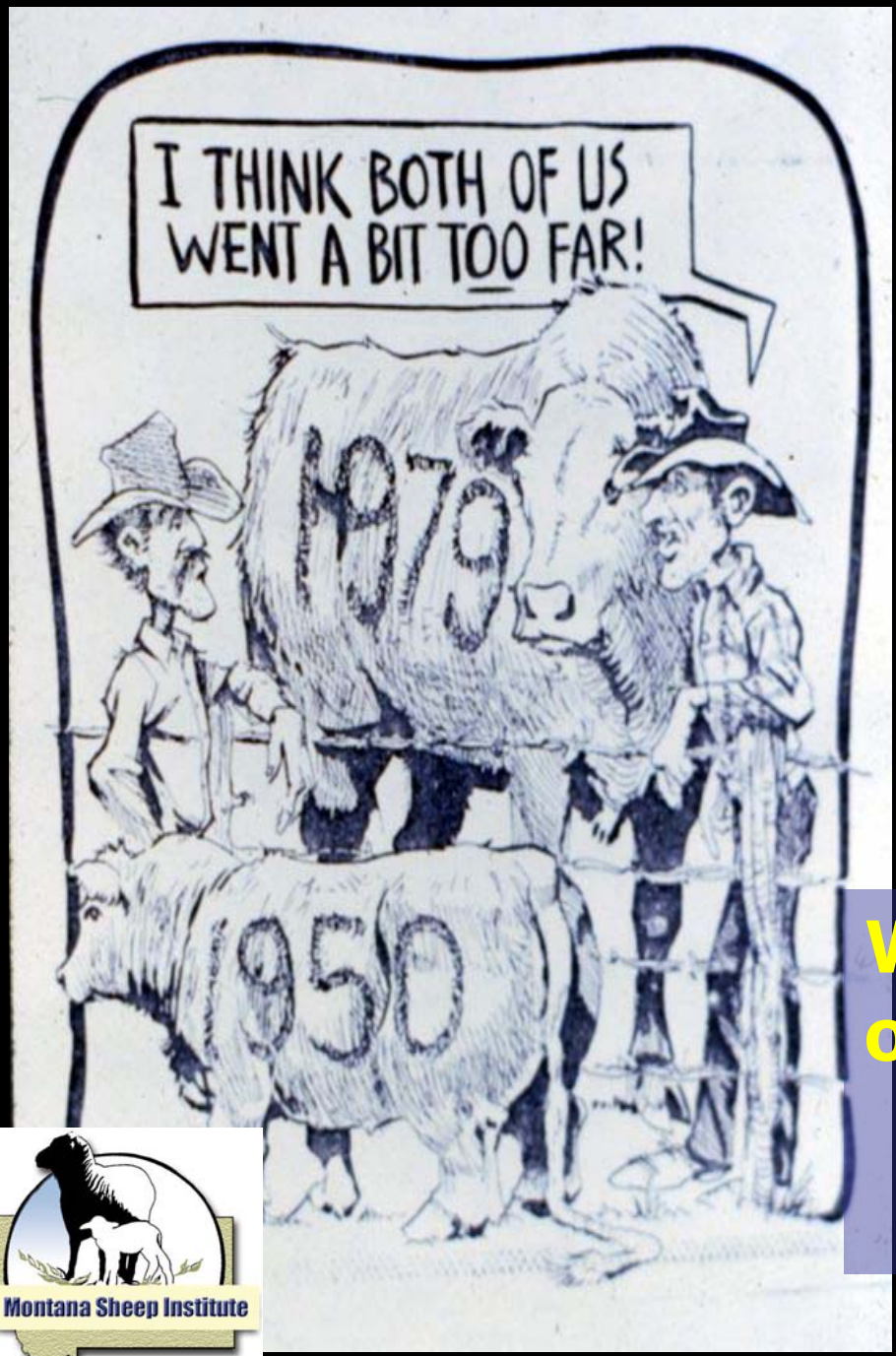

Same Forage Unit

100 --- 165 lb ewes

110 --- 150 lb ewe

Which is best depends on:

- ✓ amount of forage available
- ✓ its quality
- ✓ its relative cost.

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Does this index select against increased mature body size

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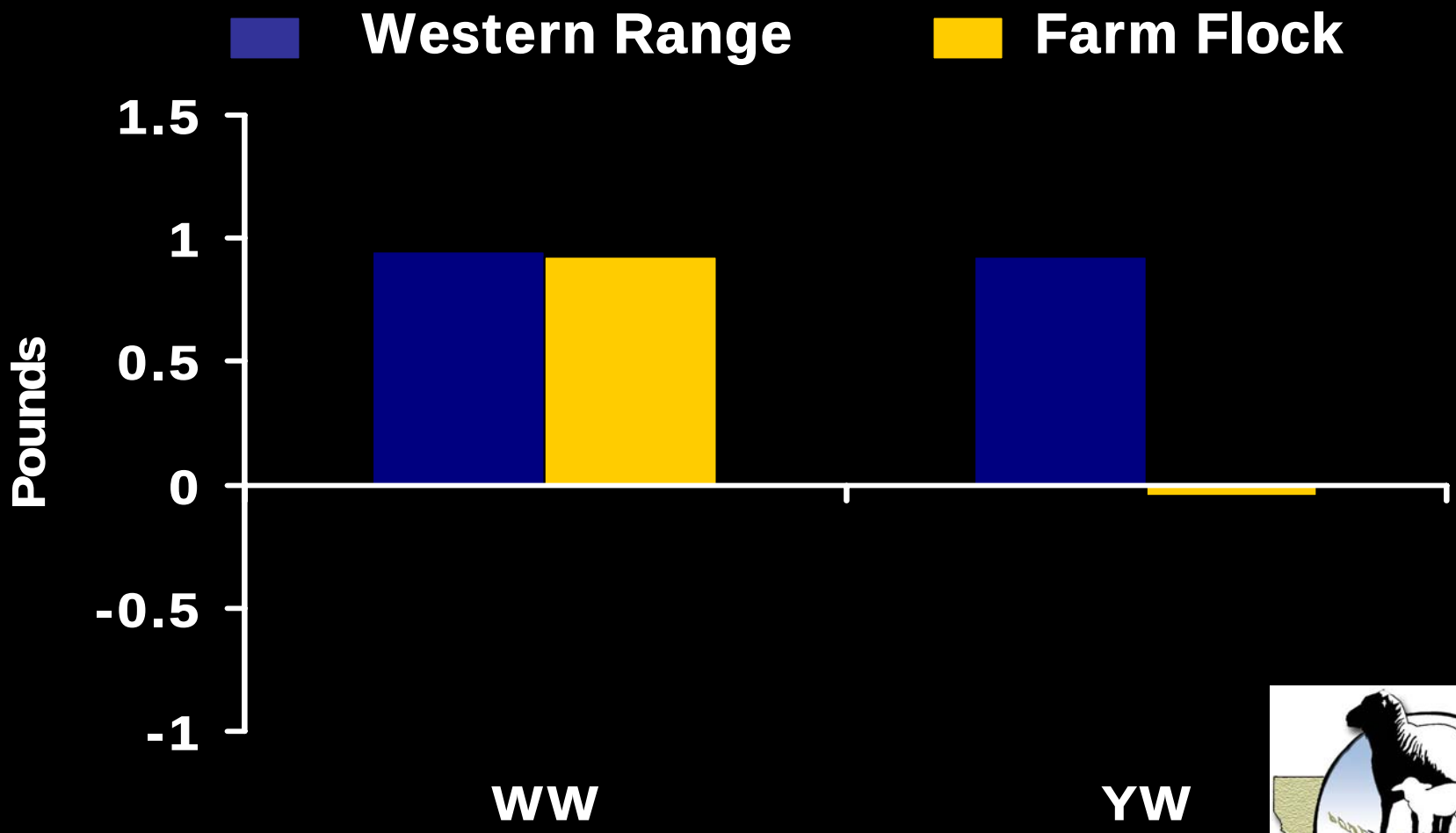
No: It slows the increase in mature body size

Expected response to selection for growth per unit change in index



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Profitability Index

Trait	Relative Weight
Weaning Weight	+ + +
Yearling Weight	- -
Maternal Milk	+
Fleece Weight	+
Fiber Diameter	-
Staple Length	(0)
Lamb Crop	+ +

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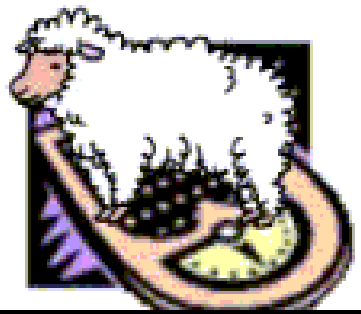
Maternal Milk

1 pound of lamb gain from milk takes 2.5 more pounds of feed than from direct lamb gain

1 pound increase in weaning weight



From MM
(Costs about 25-30 lbs hay)

From Direct Lamb Gain
(Costs about 10-15 lbs hay)

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As growers begin to study index values for their animals it will become apparent that milk EPD has effect on any of the index values

The economic value from milk although small is negative. No doubt some breeders will find this puzzling.

Heavier milking cows have higher feed requirements

However, economic research shows that once a cow provides adequate milk for her calf to meet its needs for health, maintenance and growth, additional milk is a liability.

If producers reduce the feed requirements per cow they can increase herd size without acquiring more land or purchasing more feed.

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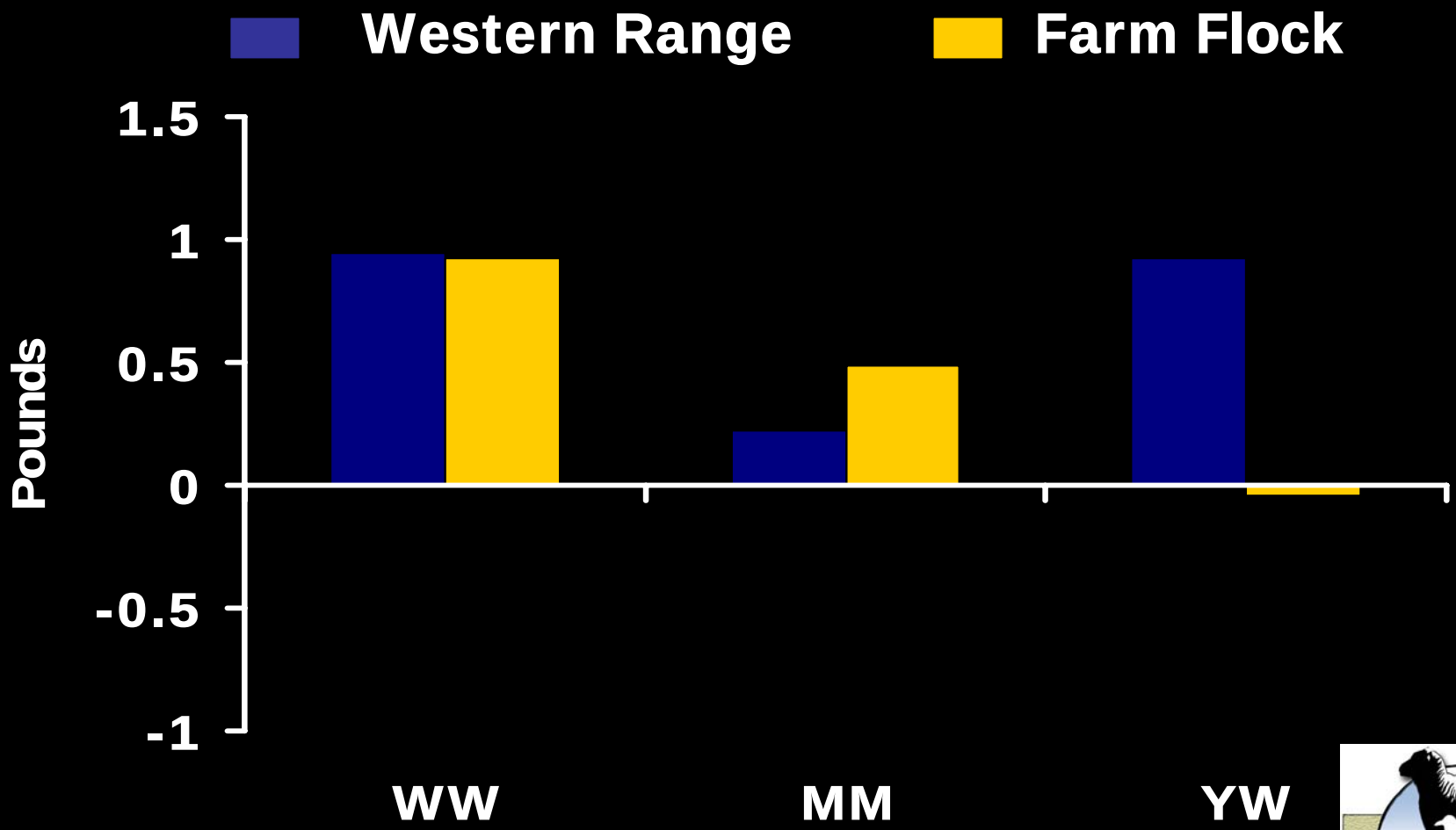
Expected response to selection for growth per unit change in index



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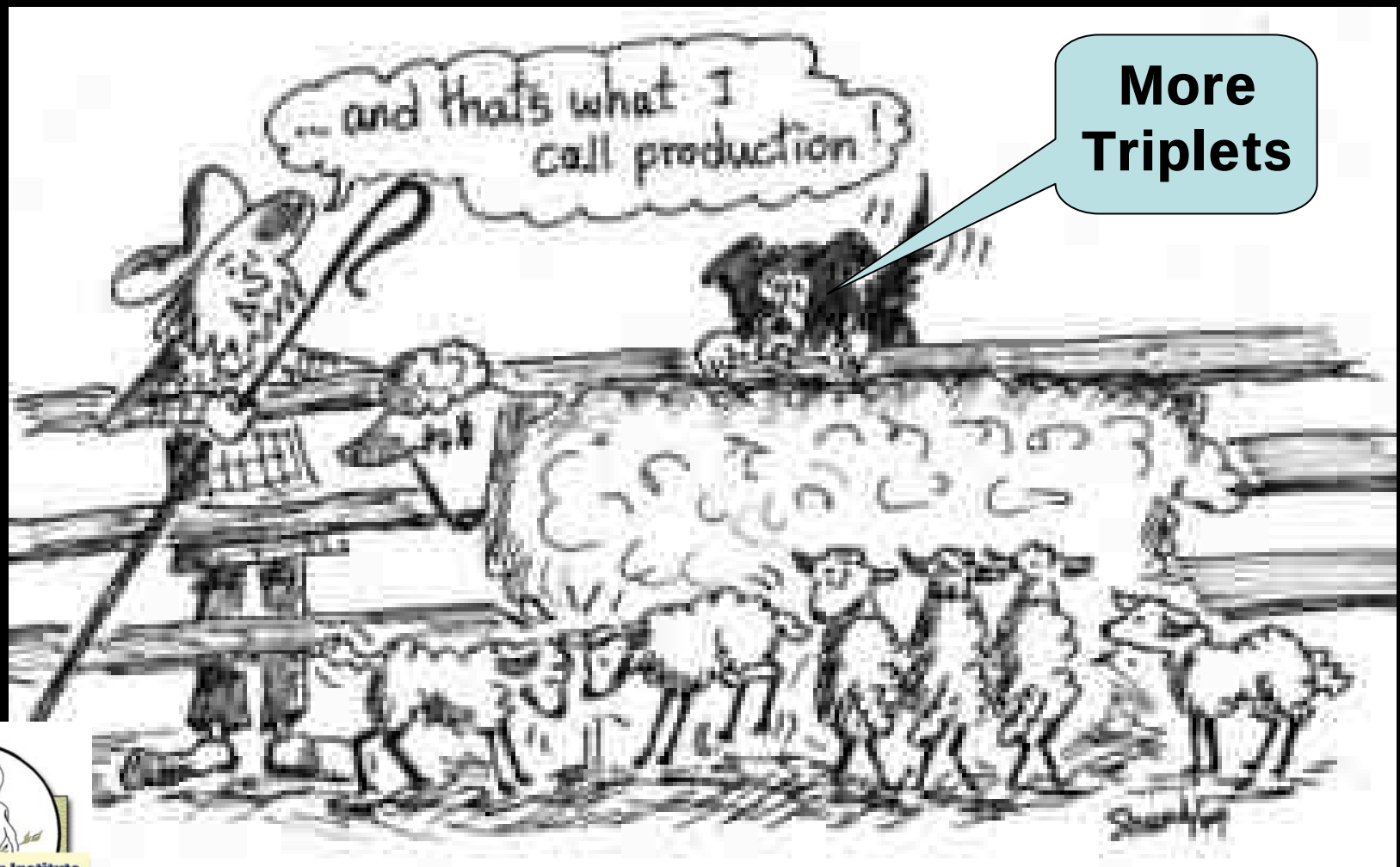
Number of Lambs Born



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For every ewe that is moved from twins to triplets

There 5 ewes that move from singles to twins

Average Drop of 170%:

- ✓ 1 more ewe with triplets
- ✓ 4 more ewes with twins
- ✓ 5 less ewes with singles

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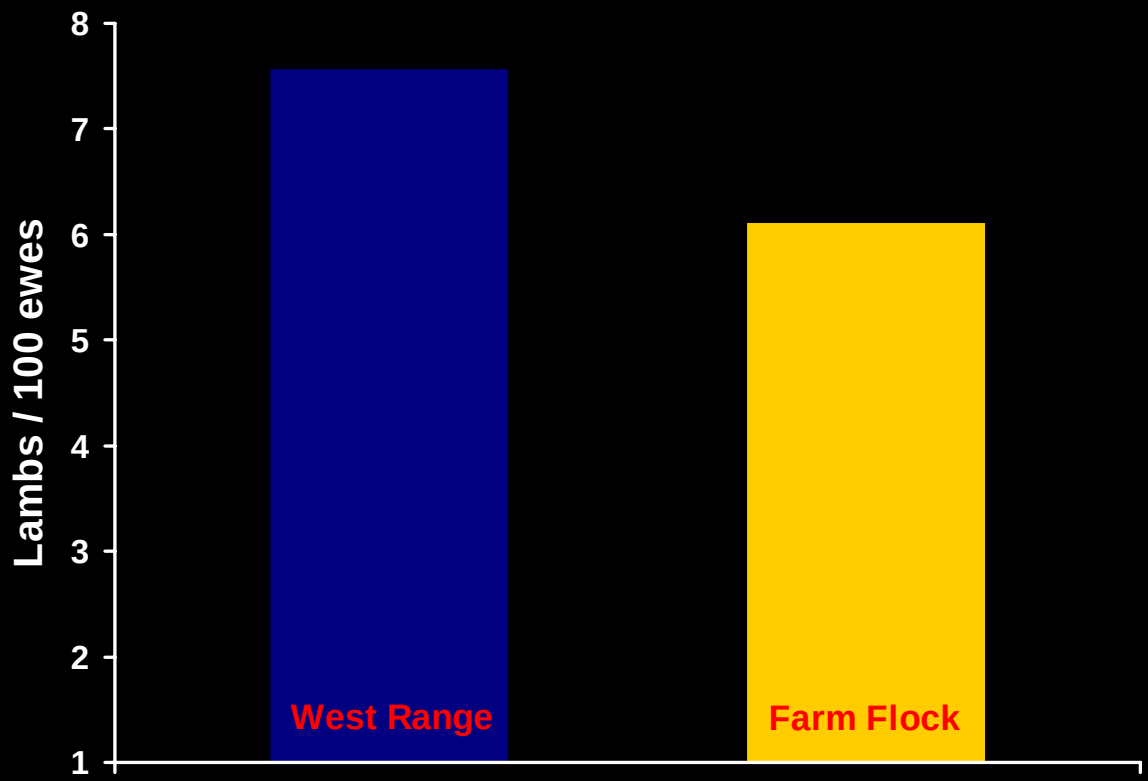
Expected response to selection for PLC per unit change in index



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Profitability Index

	Relative Weight
Weaning Weight	+ + +
Yearling Weight	- -
Maternal Milk	+
Fleece Weight	+
Fiber Diameter	-
Staple Length	(0)
Lamb Crop	+ +

About the same as Lamb Crop

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Actual Indexes

Western Range = **$1.00 WW + $ 0.26 MM - $0.26 YW + $1.92 FW - $ 0.47 FD + $ 0.36 LC**

(weight discount — low feed costs)

Farm Flock = **$1.00 WW + $ 0.36 MM - $0.40 YW + $1.14 FW - $ 0.30 FD + $ 0.19 LC**

(no weight discount — high feed costs)

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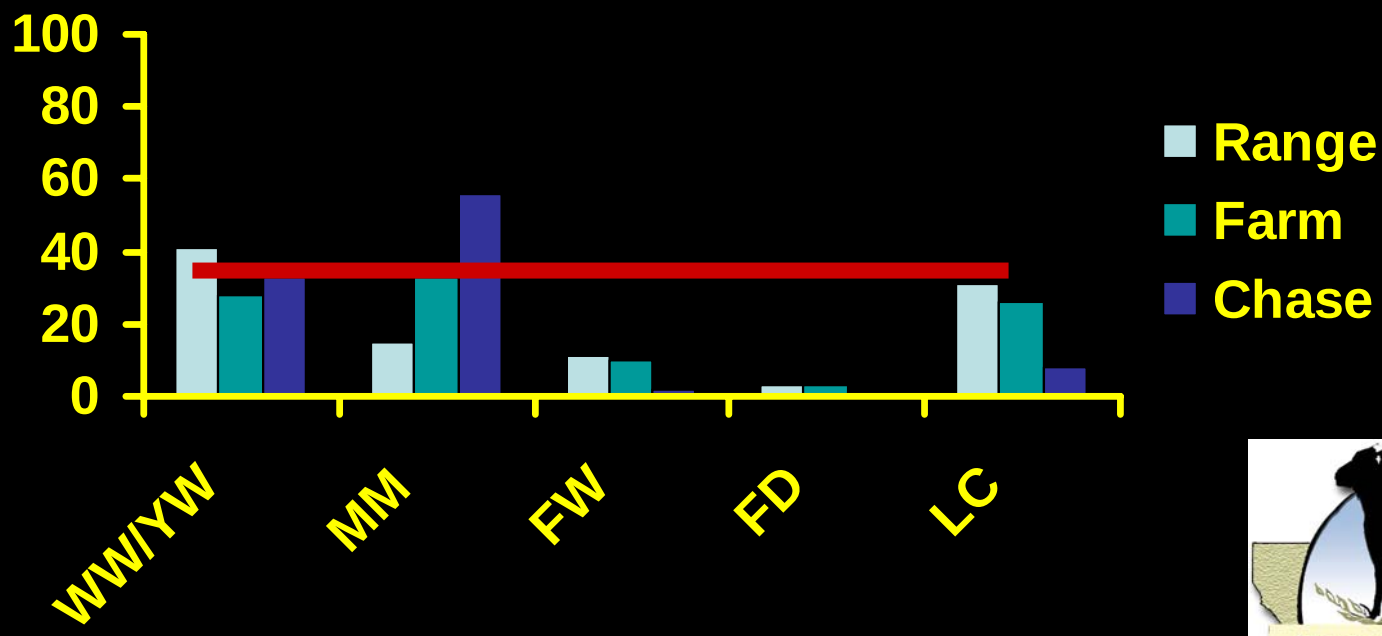
WW	MM	YW	FW	FD	LC	Range Index	Farm Index	Chase
3.0	2.0	6.0	0.2	-.2	3.0	3.52	2.18	36

Relative Contribution To final Index



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Typical EPD sheet for a set of rams

EPD's for different performance traits

Ram ID	WW	MM	YW	FW	FD	SL	LC	Range Index	Farm Index
Tag 1	5.0	0.1	10.0	0.2	-0.4	0.00	4.0	4.9	2.8
Tag 2	1.2	3.0	2.0	.2	-.1	0.02	4.5	3.6	2.6
Tag 3	3.6	2.5	5.0	0.2	-0.2	0.01	4.5	5.0	3.6
Tag 4	1.0	0.5	2.0	0.2	-0.2	0.01	10.0	4.7	2.6

Yearling Ewes

Ylr. Ewes	Range Index
Top 20	1.0
Bottom 20	5.6

That's 12 lbs of lamb per ewe

Top 20 indexing ewes weaned 239 more lbs of lamb than bottom 20 indexing ewes.

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Profit Indexes

DIFFERE

AICA

TERMINAL

SIRE

PROFITABILI

INDEX

LIMOUSI

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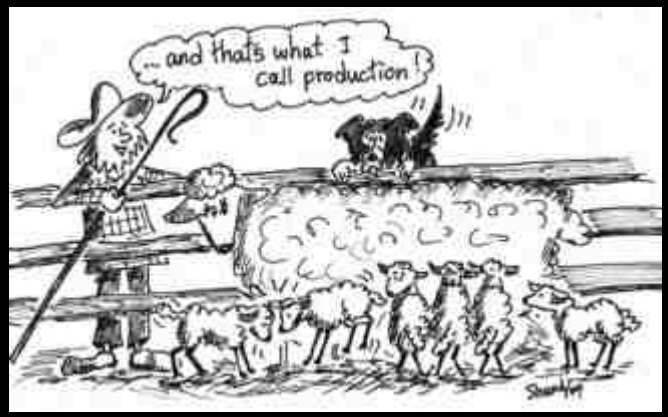
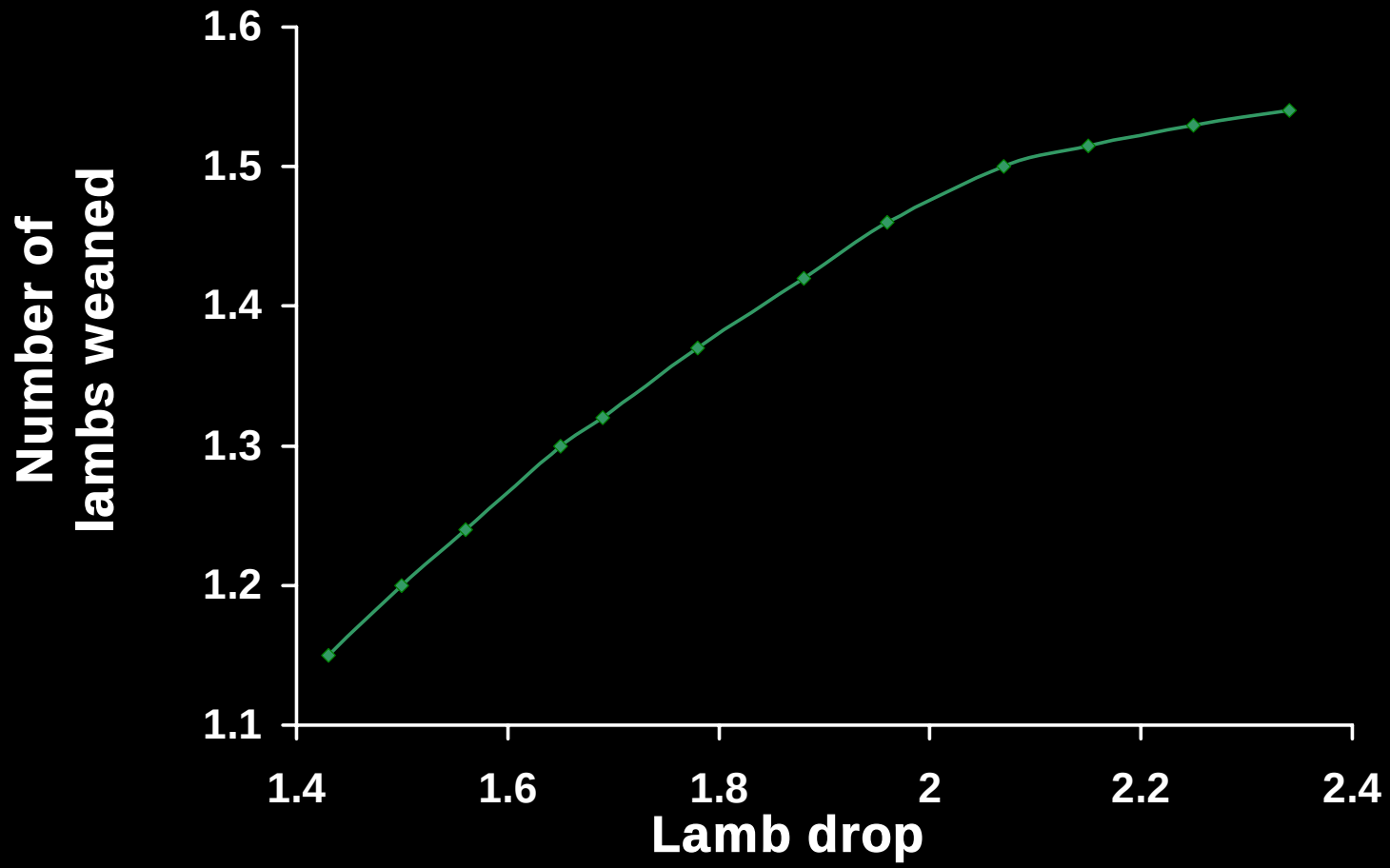


Number of lambs born vs. number of lambs weaned



Weaning weights at different lamb drop levels