

## **Can Selection Indexes Improve Profitability in Beef Cattle**

**Lee Leachman, Manager  
Leachman Cattle of Colorado**

As a bull producer, I know that my long-term business success depends on the financial success of my customers. As such, we try to select the bulls we produce for the traits that drive profit into our customers' herds. Our Angus, Red Angus, and Stabilizer herds are selected based on a maternal profit index. Our Charolais are selected on strictly terminal profit index. We produce and market over 1200 bulls per year. These bulls primarily sell to progressive minded ranchers in the high plains.

There is little doubt that EPD's have revolutionized selection in the beef industry. With EPD's we can make progress on antagonistic traits at the same time. We can increase growth, while lowering birth weight. We can increase both marbling and muscle simultaneously. However, EPD's are often misleading. Many commercial ranchers confuse the added output promised from high EPD's with higher profit. Output is not profit. With higher growth EPD's come higher costs in the areas of feed consumed, larger cow size, and potentially reduced fertility.

On the ranch, profit is driven by cow productivity (weaning weight), reproduction, and cow cost. For better or worse, cow size in commercial herds has increased dramatically in the last 20 years. This was due to selection for higher yearling EPD bulls. Many seedstock cows weigh over 1600 pounds today. Using 100+ pound yearling EPD bulls will lead to even bigger cow size in commercial herds. Unfortunately, bigger cows wean a lower percentage of their body weight. As a result, pounds weaned per acre are reduced as we increase cow size.

In the feedlot, the profit drivers are feed conversion, carcass merit, carcass weight, and health. Because feed conversion is such a major factor, Leachman Cattle started measuring feed intake and conversion in bulls back in 2004. We have collected over 11,000 feed intake records on our seedstock. In a typical group of 100 bulls on test, we find wide variation on intake and conversion. In the spring of 2013, we found two bulls that both gained the same. One bull ate 17 lbs. of dry matter per day and converted 4:1. Another bull ate over 40 pounds of dry matter and converted 10:1. This type of conversion difference translates to huge differences in daughter feed requirements and to the cost of gain on the resulting steer progeny. That is why we must measure feed intake!

Other major factors that affect profitability include carcass quality and hybrid vigor. Marbling is a major driver of eating satisfaction. As a result, consumers pay large premiums for CAB and Prime carcasses compared to low Choice and Select grades. Hybrid vigor can increase pounds weaned per cow exposed by 23%. This is also a major profit driver. In the end, ranchers must make decisions taking into account growth, reproduction, carcass merit, cow size, feed intake, and hybrid vigor. Finding the bull that will best improve a rancher's bottom line is difficult if not impossible.

In 2004, Leachman Cattle started calculating and using selection indexes. Our indexes are based on estimating the production differences between bulls and how those differences affect both income and costs. The system allows us

to simultaneously improve every economically important trait. It helps us find and use the best bulls. As a result, our genetic improvement for profit is more rapid. Customers using our indexes are reducing cow size, improving feed conversion, adding to carcass weight, and improving carcass quality all at once.

These indexes are so effective, that we are now using our feeder index to predict the feedlot merit of a group of steers. Through a company called Verified Beef, you can receive a certificate that estimates the relative market value of your feeder calves. Feedlots across the country recognize that huge genetic differences exist between herds. To find the best cattle, feedlots are willing to pay premiums for superior genetic merit calves.

Selection index technology has been around for decades. It has been successfully used in pigs, chickens, and dairy cattle. The same technology will help us make beef cattle better. By using indexes, we can improve the profitability of beef cattle by over \$10 per head per year. If you miss out on this technology, you could fall behind by hundreds of dollars per head. If you use the technology, you could build a \$100/ head advantage over your neighbor. You really cannot afford to let this opportunity pass!

# Can Selection Indexes Improve Profitability? What Time Has Taught Us about Selecting for Profit

Lee Leachman  
Leachman Cattle of Colorado  
December 14<sup>th</sup>, 2013

## We are in the bull business

- We select Angus, Red Angus, South Devon and Stabilizer for maternal traits that maximize cow/calf profitability.
- We select Charolais for terminal traits.
- We produce our bulls through a network of 35 cooperators (6,500 cows) and a pool of ET donors.
- Each year, we place over 1,200 bulls on test at Wellington, CO.
- Since '04, we have marketed over 10,000 bulls through PT and six annual sales.
- We export semen and embryos to UK, NZ, and throughout South America.



Angus



Stabilizer



Red Angus



Charolais



# Can We Change Cattle? Yes – Using EPD's!

- 9 times more accurate than simple weights and ratios.
- Allow us to beat the genetic antagonisms
  - Birth to growth
  - Muscle and marbling
- Find the outliers that put it all together.



Top 1% IMF, Top 5% REA  
Top 20% on 12 other traits  
Still the top 5% on Profit  
Born in 1997!

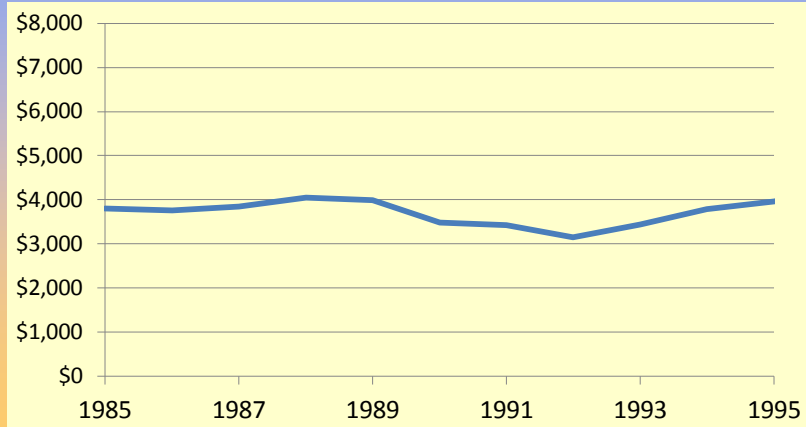


## Is Output Profit?

- EPD's measure output, but they usually don't measure cost.
- Higher growth animals reach larger weights at a given age.  
How?
  - They eat the same and grow more?
  - NO! They eat more and grow more.
- Basic EPD's ignore the cost of higher growth:
  - More feed consumed.
  - Larger mature cow size.
  - Reduced fertility.



## Leachman 10 Year History– No Genetic Change in Genetic Potential for Profit



## The Ranch Profit Drivers:

- Output: What does her calf weigh?
- Reproduction:
  - Does she breed at 15 months?  
(Heifer pregnancy)
  - Does she breed back early?  
(Days to conception)
  - Does she stay in the herd?  
(Stayability)
- Cow cost: How much does she eat?



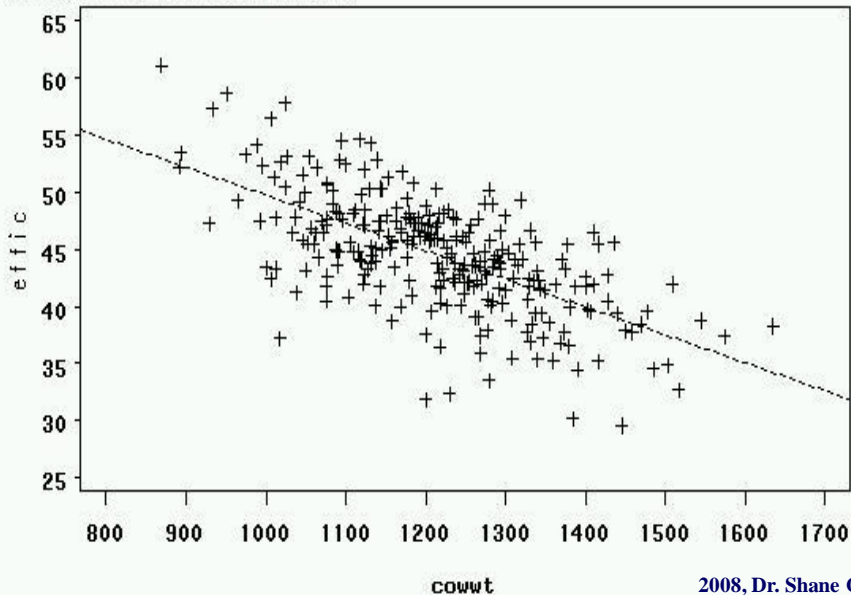
# How Big are Beef Cows

- Are your cows bigger today than they were 10 years ago? Are they big enough?
- When was the average sire of your mature cowherd born?
  - 2004 – 9 years ago!
  - He had a yearling EPD of +68  
What daughters will a +100 or +110 YEPD make?
  - Many of the dams of today's top growth bulls weigh over 1600 pounds.
  - Will they reproduce? Will they be efficient?



## % of Wt Weaned vs Cow Wt

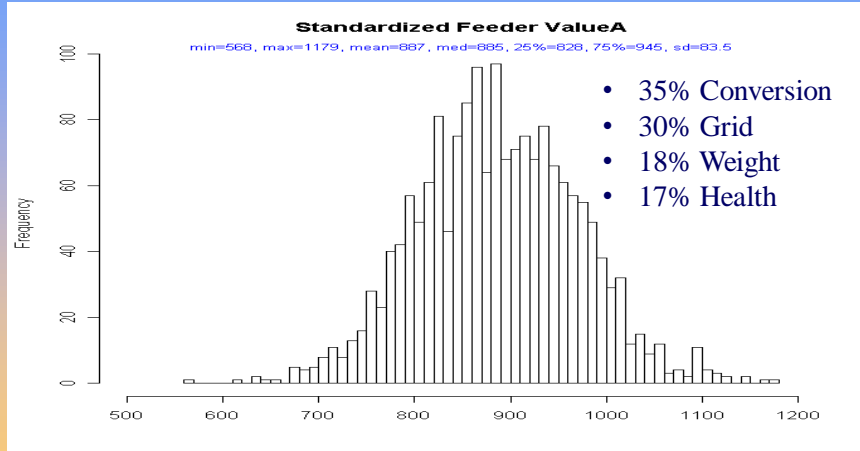
$$\text{effic} = 74.192 - 0.0245 \text{cowwt}$$



2008, Dr. Shane Gadberry  
University of AR Extension

# Feedlot Profit Differences

➤ How big are the value differences on a 650 pound steer?



◎ **From as little as \$550 to as much as \$1175!**

From 185,000 steers at DCFY in Oberlin, KS

## Here is how we measured individual feed efficiency.

### We have over 11,000 Intake Records

EID Reader

EID Tag



The bunk sits on four load cells.

This load cell weighs the bunk every 1/2 second and sends the weight to a nearby computer. Each bull has an EID tag that is read by the panel reader. This then tells us who is in the bunk eating. We can feed up to 8 bulls per feeder. We test for 70 days. We test meaningful sized contemporary groups, adjust for body weight, and calculate an intake EPD and a F:G EPD

Load  
Cells



## Feed Intake: A tale of two bulls...



- Same herd. 1244 AYW vs. 1222 AYW.
- 17 vs. 42 lbs. of dry matter / day (9,125 lbs. / year).
- Converted 4:1 vs 10:1.
- 40% Heritable = 112 cows vs 75 cows on same grass.
- Which bull's daughters or steers do you want?



## We measured sire lines: Protégé was a winner!

- At LCoC, we identified Protégé as one of our top feed conversion sires.
- As an ABS bull, his progeny proof earned him the following bragging rights.
- Top 1% Post Weaning Gain
- Lowest 30% on Intake
- #2 Feed Conversion
- #1 Overall Profitability



**It's Repeatable!**





## Will Bull Data Predict Steer Performance?

Sire Group	# Head	Mean Wt	ADG	DM Intake	F/G Adj for Wt	Sire F:G EPD	F:G Proof Accuracy	Feed Cost Savings
Sons of Objective	25	917	3.15	21.45	6.85	0.43	high	-\$91
Multiple Sires	198	921	3.21	19.04	5.96	0.00	n/a	\$0
Sons of F. Direction	28	915	3.46	19.65	5.75	-0.01	low	+\$22
Leachman Meteor	25	981	3.55	21.13	5.67	-0.23	med	+\$30
Misc LCoC Sires	46	929	3.31	18.62	5.61	-0.24	med	+\$36
Leachman Scotsman	27	968	3.39	19.39	5.51	-0.35	high	+\$47
Leachman Resolution	32	926	3.36	18.28	5.44	-0.32	low	+\$54
Leachman Ramses	22	910	3.62	18.91	5.32	-0.41	med	+\$66
Leachman Paradigm	48	937	3.56	18.90	5.25	-0.54	med	+\$73

- The commercial data lines up with the EPD's.
- From top to bottom, \$164 / head difference!



## Real World Results: RT Cook

- Used 100% Leachman high \$Profit Leachman bulls (top 8% ranking).
- Cows (2 – 6 years of age) in BCS 5.5 weighed 1175 pounds (534 kg) and wean 630 pound (286 kg) calves.
- Fed to a 930 pound (422 kg) carcass weight.
- Small cows bred to maternal bulls.
- Converted 5.4:1 on the finished ration from 750 pounds to a 1415 pay weight – saved \$0.20 / pound cost of gain.

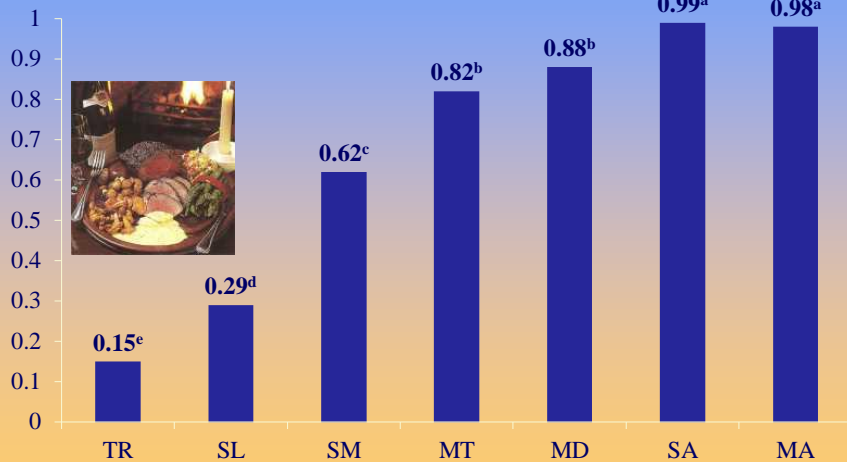


**Worth \$150 over market!**



## Does Carcass Quality Matter?

Probability of a Positive Sensory Experience



Colorado State University M.S. Thesis: M. R. Emerson (2011)



## Real World Results: K Lazy K Ranch, SD Steers

- Used our highest \$Profit, high feed conversion Angus bulls.
- In 2012: 396 steers went 99.5% Choice, 88.4% CAB and 25.1% Prime
- Packer offered us a \$220 cash premium.
- More Prime, YG1's than Selects!
- In 2013, 54% Prime!



**Unmatched Quality!**



## What about Crossbreeding?

- Crossbreeding adds 23% more pounds per cow exposed.
- Problems:
  - Hard to keep uniformity.
  - Angus is the dominant breed.
- Solution: Use hybrid or composites (Stabilizers)
  - Keep uniformity.
  - Angus type.
  - Competitive on carcass.
  - Genetic merit keeps pace with Angus.



## So, what is the most important factor/trait to improve?

- Growth?
- Reproduction?
- Carcass merit?
- Structure?
- Cow Size?
- Efficiency?
- Feed intake?
- Hybrid Vigor?



**PROFIT!**



# What is a Selection Index

➤ A selection index helps you select for multiple traits at the same time.

- Example: Miles City Line 1 Herefords  

$$\text{Index} = -3.5 \times \text{BEPD} + 0.5 \times (\text{WEPD} + \text{YEPD})$$

➤ Who uses selection indexes?

- Swine & Poultry
- Dairy cows
- Beef cows



# Three profit indexes on every bull

➤ **\$Ranch:** Profit from birth through weaning.

- Fertility Milk Growth
- Cow feed intake

➤ **\$Feeder:** Profit from weaning to harvest:

- Feed conversion
- Carcass value
- Carcass weight

➤ **\$Profit:** puts it all together. \$Ranch + \$Feeder.

- One number that predicts your bottom line!

1 LCOC PROTEGE G651Y											
17446104	09/23/11	A	P	Pen:	Scores						
100AN	BLK	B	TPL	CAF	C. Ease	*****					
Rito 112 of 2536 Rito 616					Growth	*****					
GAR-EGL Protege					Maternal	***					
L B 6807 Isabel 339					Feed/Carc	*****					
Gardens Pascal E36					Phenotype	*****					
TOP Donomere T533					Disposition	4					
LCOC DONOMERE PG234											
Act BW	BW	WW	YW	MI	IME	REA	MWT	E/G	Intake	YHT	SCR
60	-1.6	63	116	21	0.84	0.69	1268	-0.33	107	0.70	-0.14
\$RANCH		\$33		20%		\$FEEDER		\$119		0.3%	
										\$PROFIT \$13,423	
										0.4%	

The top Protege son we have found anywhere!



# Leachman \$Profit™ EPD

- A financially balanced index based on a simulated herd.
- Example of how they work:
  - Leachman Paradigm: \$13,833
  - Retail Product: \$9,960
  - Difference: \$3,873
- This works out to \$38.73 per head on 100 calves.



Leachman Paradigm



Retail Product

Average 2013 born, registered Angus bull  
has a \$Profit EPD of \$8,140.



It's Really just one thing!

# \$PROFIT™

\$Profit	BW	WW	YW	Milk	DTC	MWT	Intk	FG	IMF	REA	BFt
\$6,000	+2.8	43	77	17	-5.1	1250	40	0.00	0.10	0.26	-0.01
\$12,000	+0.8	51	91	22	-5.4	1245	-34	-0.24	0.24	0.67	0.01

- Better on the ranch, in the feedlot & on the rail.
  - We are not single trait selecting!



## Customers Using Leachman Indexes: Realistic 2023 Goals

- **\$Ranch will produce:**
  - Cow under 1250 pounds
    - Eats under 23 lbs. of dry matter per day.
    - Breeding rate of around 92% pregnant.
    - Produce a calf that weighs over 45% of cow body weight at 205 days.
- **\$Feeder will produce:**
  - Feeder calf performance
    - Gains over 3.8 lbs per day.
    - Converts  $\leq 5:1$ .
  - Carcass specs
    - Over 925 lb carcass weight.
    - Over 70% in Yield Grade 1 & 2 categories.
    - Over 75% in CAB (high quality).

**Use \$Profit to put  
it all together!**



## What Does Top \$Profit Look Like?

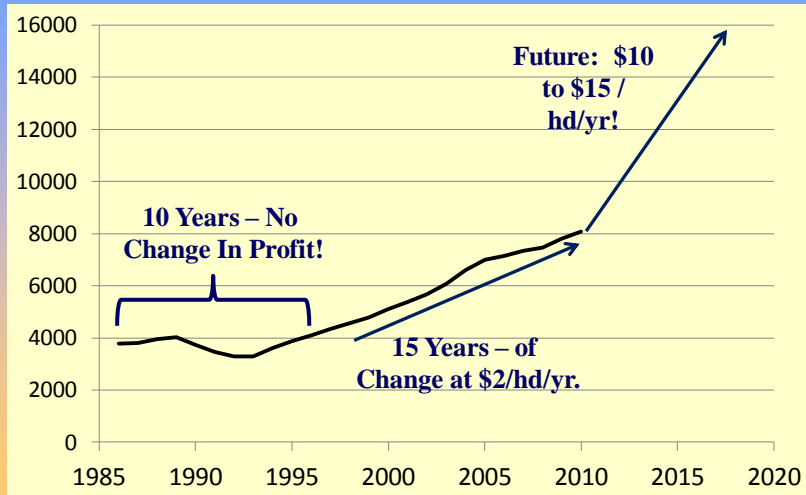
- #1 on \$Profit
- Top 0.1% \$Ranch
- Top 0.1% \$Feeder
- Converted 3.9:1
- Intake of 17 lbs / day
- 17.4 inches<sup>2</sup> REA
- 4.5% IMF
- Very quiet
- -1.1 BW to +104 YW
- Elite pedigree



**\$17,400 \$Profit!**



## Our Genetic Trend on Profit



## So What?

- You're a commercial cow/calf rancher.
- You sell calves at weaning and typically get the average price in the market place.
- Why does any of this matter to you?
- **First – you can build a better cow herd that eats less and produces more!**
- **Second – you can get paid for the quality you produce!**



## Reputation Feeder Cattle Certificate 3

**1** Certificate Date  
6/13/2013

**USDA**  
PROCESS VERIFIED

**Age and Source (USDA Audited Certificate)**  
This certification assures the ranch origin as noted above. The cattle were born between 10/12/2012 and 12/31/2012

**Calf Management Practices (VB Audited Certificate)**  
These cattle were managed in accordance with prescribed veterinary practices as follows:

Action	Purpose	Product	Administered/Expected Date
Vaccination	Blackleg (3-way & 9-way)	Vision 8 Somnus	3/19/2013 - Audited
Vaccination	5 way Viral and Pasteurella	Vista Once SQ	3/19/2013 - Audited
Vaccination	Blackleg (3-way & 9-way)	Vision 8 Somnus	5/28/2013 - Audited
Vaccination	5 way Viral and Pasteurella	Vista Once SQ	5/28/2013 - Audited
Weaned			4/25/2013 - Audited

### Genetic Merit Scorecard

Bruce Banks Tugaw Ranches Filer, ID 2012 Fall Steers Estimated at a base weight of 510 lbs		\$22.06
Relative Value / CWT		
Average Daily Gain	Carcass Weight	Feed:Gain
★★★★★	★★★★★	★★
Ribeye Area	Yield Grade	Percentage of Choice
★★★★★	★★★★★	★★★

Certificate Number: 201331914425432206

Signed: *Jim Davis*

Some of the programs listed on this certificate are PENDING. The certificate for that program will be provided upon receipt of ALL required producer documentation.

# Tugaw Fall '12 Steer Calves

## Marketed May 31<sup>st</sup>

- Pre-conditioned and weaned per a Vac 45 protocol.
- Sired by known, high quality genetics.
- Base weight of 540 pounds with a mid-June delivery date in Twin Falls, ID.
- Rep. Jim Davis, predicted the calves would bring between \$1.50 and \$1.58.

Genetic Merit Scorecard		
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Average Daily Gain	Carcass Weight	Feed:Gain
★★★★★	★★★★★	★★
Ribeye Area	Yield Grade	Percentage of Choice
★★★★★	★★★★★	★★★

Calves sold  
for \$1.68 with  
aggressive bidding!

A clear value signal is being sent!





## LU Ranch: Highest Genetic Merit Score Card Yet at \$24.72

- As seen in the Angus Journal!
  - Dec '12 Cull Heifer Data
  - From 906 lbs., gained 4.9 per day. Converted 4.7:1
- 42% YG 1 & 2, only 4% YG 4's
  - 882 lb. carcass with a 14.4 REA!
  - 98% Choice with 82% CAB & Prime.
  - Returned \$1,317 per head.



**As good as they get!**



## Our Competitors are Making Maximum Genetic Progress:

**Day 43**

**Day 57**

**Day 71**

**Day 85**

1957  
Chicken  
Genetics



2001  
Chicken  
Genetics



**Multi –trait, dollar indexes worked in chickens!**

# Questions?

- We invite you to join us in Colorado for our late March Spring Seminar & Sale!

