Production (and) or Profit? Focusing Our Breeding Objectives By Selecting For Profitable Genetics, Not Necessarily High Production Genetics

Matt Spangler
Extension Beef Genetics Specialist
University of Nebraska-Lincoln

NO

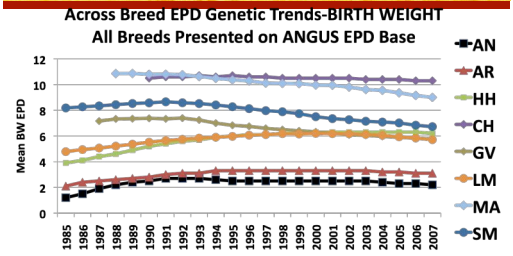
YES

QUESTIONS?

Profit…duh

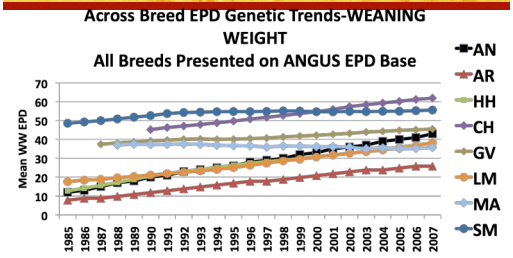
- Profit = Revenue - Expense

BW EPD Genetic Trends



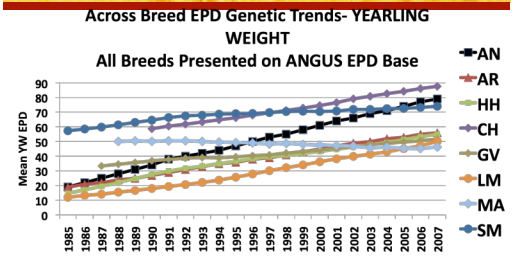
Weaber and Fennewald, 2009

WW EPD Genetic Trends



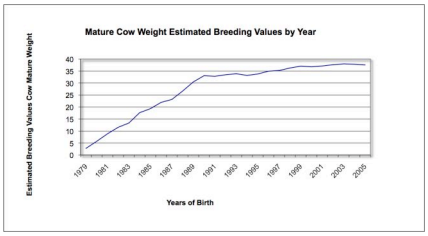
Weaber and Fennewald, 2009

YW EPD Genetic Trends

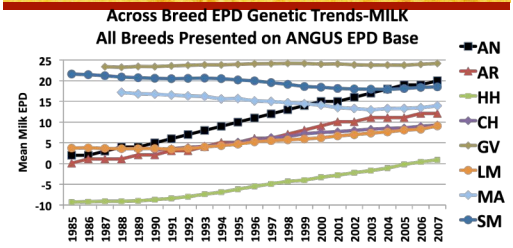


Weaber and Fennewald, 2009

Trends in Mature Weight



MILK EPD Genetic Trends



Weaber and Fennewald, 2009

So Don't Try To Increase Things?

- Optimum
- The point at which a condition, degree, or amount of something is most favorable

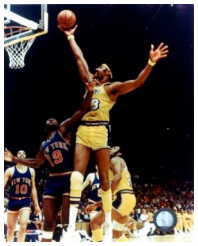
Example

- Some breeds compliment each other very well

Sire Breed	% YG 1 & 2	% Choice & Prime	YG 4	Standards
British (AN,AR,HF)	33.7	86.1	22.9	0.0
Continental (SM,GV,LM,CH)	69.8	57.6	3.3	0.3

Cundiff et al., 2004

Personal Example



Cow Size	Milking Level	lb of milk/ cow/day	lb TDN Needed	lb CP Needed
1000	Average	10	12.4	1.9
1000	Above Avg	20	14.8	2.6
1000	Superior	30	17.2	3.5
1200	Average	10	13.8	2.1
1200	Above Avg	20	16.2	2.8
1200	Superior	30	18.7	3.5
1400	Average	10	15.2	2.3
1400	Above Avg	20	17.6	3.0
1400	Superior	30	20.1	3.7

Source: Nutrient Requirements of Beef Cattle, 1984 & 1996.

Optimal Milk Production

- Why is too much milk a concern?
  - Increased input costs
  - Failure to rebreed in limited feed environments

Economic Efficiency

	Low	Med.	High
Income			
Weaning	496.40	493.60	501.10
Slaughter	810.1	808.40	789.40
Expense			
Weaning	549.80	553.40	568.80
Slaughter	814.20	837.50	828.30
Econ. Eff.			
Weaning	90.3	89.2	88.1
Slaughter	99.5	96.5	95.3

Fitting Genetics to Environment

Production Environment		Traits					
Feed Availability	Stress	Milk	Mature Size	Ability to store energy	Resistance to stress	Calving ease	Lean yield
High	Low	M-H	M-H	L-M	M	M-H	H
	High	M	L-H	L-H	H	H	M-H
Low	Low	L-M	L-M	H	M	M-H	M
	High	L-M	L-M	H	H	H	L-M

Adapted from Gosey, 1994.

Tools We Have

- Milk
- Mature Weight
- Immature Weights

Early Growth Related to Mature Size

	BW	WW	YW
MW	0.57	0.62	0.45

Northcutt and Wilson, 1993

Mature Size and Carcass

	MW	HT	CS
HCWT	0.81	0.69	0.23
RPP	-0.05	0.03	-0.12
FAT	-0.02	-0.16	0.20
LMA	0.34	0.25	0.24
MARB	-0.15	-0.17	-0.03

Nephawe et al., 2004

Newer Tools

- ME
- Dtf

Problem

- Too many traits
- Genetic antagonisms
- Some are ERTs, some indicators
- He told me to select for profit

Economic Index Values

- Method of multiple trait selection on aggregate merit
- Collection of EPDs multiplied by economic values
- A particular index represents EPDs relevant to a breeding objective
  - i.e. retained ownership and sell on a grid

Selection Index

- Two Step approach by Henderson (1950s)
  - Calculate predictions of merit (EPD) for each trait in selection objective
  - Weight each prediction by it's Relative Economic Value (REV)
- Equivalent to Hazel approach

$$H = a_1 EPD_1 + a_2 EPD_2 + \ldots + a_n EPD_n$$

Angus

- Maternal
  - $W - Weaned Calf Value
  - $EN - Cow Energy Value
- Terminal
  - $F - Feedlot Value
  - $G -Grid Value
    - $QG - Quality Grade
    - $YG - Yield Grade
  - $B - Beef Value

Cow energy value ($EN)

- Dollars in savings/cow/yr.
- Energy requirements for lactation and mature cow size.
- Is a component of $W

Beef value ($B)

- Not the sum of $F and $G!
- Includes:
- YW, CW, Carcass and Ultrasound traits
- Selection for both quality and yield ($QG and $YG)
  - Note: $YG is a combination of ribeye area, external fat, and carcass weight
- Weight not double counted
- Correlation with $F = 0.70

Hereford

- Maternal
  - BMI$ - Baldy Maternal Index
  - BII$ - Brahman Influence Index
  - CEZ$ - Calving EZ Index
- Terminal
  - CHB$ - Certified Hereford Beef Index

Baldy Maternal Index ($BMI)

- For sires mated to Angus-based females in a rotational system
- WW weighted positively, YW slightly negative
- More emphasis on IMF than REA
  - Not much incentive for < YG3
- CE and fertility important
- Assumes
  - Steers retained through the feedlot
  - Sold on a grid-based system (CHB or others)

Certified Hereford Beef Index ($CHB)

- All offspring sold towards CHB grid
  - No emphasis on fertility or milk
- Positive weighting of both WW and YW
- CE is emphasized
- All carcass traits emphasized
  - IMF, REA, and FT

Simmental

- API - All-Purpose Index
  - Bull used on cows and heifers
  - Heifers retained
  - All other progeny sold grade and yield
- TI - Terminal Index
  - Bull used on mature cows
  - All progeny sold grade and yield
  - When mated to Angus cows

Limousin

- $MTI - Mainstream Terminal Index
- Expected profit per carcass
- Mated to Angus x Hereford females
- Emphasis post-weaning growth, yield grade, and quality grade

Gelbvieh

- FM - Feedlot Merit
  - Expected gain and feedlot efficiency (DtF)
- CV - Carcass Value
  - QG, YQ, and carcass weight

Indexes vs. Independent Culling Levels (ICL)

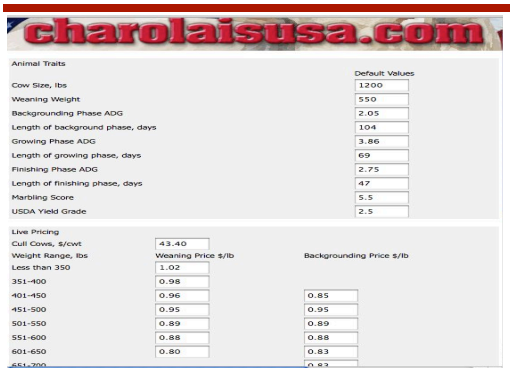
CED = 2.1 WW = 43 MM = 18 SC = 0.9 IMF = 0.04

	CED	WW	MM	SC	IMF	$BMI
1	2.5	55	20	1.0	0.10	20.16
2	5.0	50	25	1.2	-0.10	19.55
3	4.0	45	20	1.0	0.25	20.35
4	1.6	62	19	1.0	0.20	21.64

Moser, 2005

Charolais

- Terminal Sire Profitability Index
- Assumes Charolais bulls bred to different breed of cows
- Interactive
  - Dependant on input from your operation
  - Herd averages (cow wt, ADG)
  - Production practices (length of production phases)
  - Current prices
  - 'Out' carcasses significant
    - Possible to select low growth bulls


charolaisusa.com

Animal Traits

	Default Values
Cow Size, lbs	1200
Weaning Weight	550
Backgrounding Phase ADG	2.05
Length of background phase, days	104
Growing Phase ADG	3.86
Length of growing phase, days	69
Finishing Phase ADG	2.75
Length of finishing phase, days	47
Marbling Score	5.5
USDA Yield Grade	2.5

Live Pricing

Cull Cows, $/cwt	43.40	
Weight Range, lbs	Weaning Price $/lb	Backgrounding Price $/lb
Less than 350	1.02	
351-400	0.98	
401-450	0.96	0.85
451-500	0.95	0.95
501-550	0.89	0.89
551-600	0.88	0.88
601-650	0.80	0.83
651-700		0.83

Terminal or Maternal?

Terminal

- $B, $F, $G (Angus)
- TI (Simmental)
- CHB$ (Hereford)
- MTI (Limousin)
- FM and CV (Gelbvieh)
- Charolais

Maternal

- $W, $EN
- API
- BMI$, BII$, CEZ$

Key to Using Index Values

- Only use index values that fit your breeding objective
- Understand population statistics
- No accuracy values

Action Points

- Record and turn in
  - Mature weights
  - Body condition scores
- Track cost
- Use multiple trait selection
  - Pressure on Profit

Index—Who Decides Parameters?

Summary

- Optimum values can lead to profitability
- Genetic antagonisms exist
- Economic index values can help select for profit
- What is the correct form/delivery method for these values?

"The native cattle are extinct, but the island is full of artificial breeds. The agriculturalist Bakewell created sheep and cows and horses to order, and breeds in which everything is omitted but what is economical. The cow is sacrificed to her bag; the ox to his sirloin."

Ralph Waldo Emerson

University of Nebraska Lincoln

Go Big Ten ???