Matching Production Levels to Environmental Conditions

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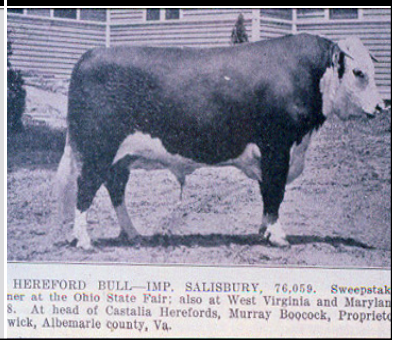
1898

Champion Hereford Bull Ohio State Fair Imported from England



HEREFORD BULL—IMP. SALISBURY, 76,059. Sweepstak ner at the Ohio State Fair; also at West Virginia and Marylan 8. At head of Castalia Herefords, Murray Boocock, Proprieto wick, Albemarle county, Va.

40's and 50's "Era of Insanity"

1953

Champion Angus Female Chicago International Exposition

60's "Recognition of Need to Change"

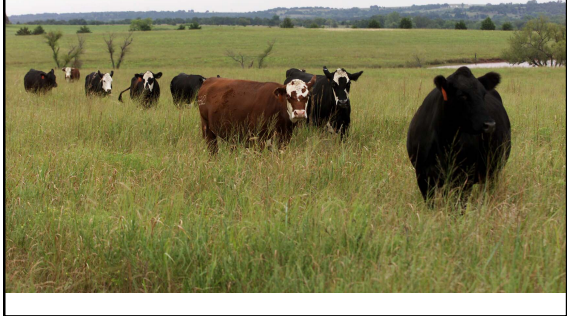
1969

Grand Champion Steer Chicago International Exposition

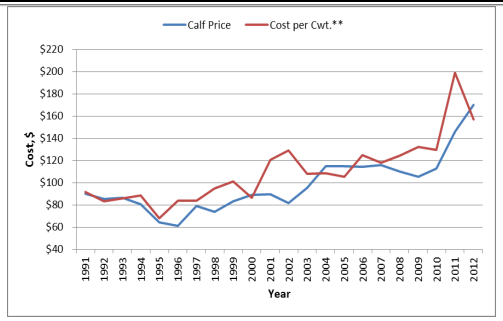
70's and 80's
"Return to Insanity"

90's and 2000's
"Back Again"

Matching Forage Resources:
Are we getting closer?



Calf Price and Cost of Production



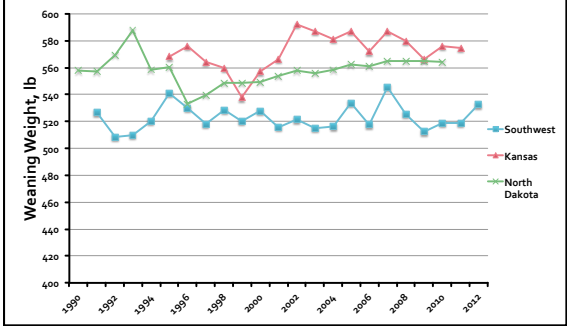
OK, NM, and TX SPA Summary, Bevers 2013

Efficient Cows

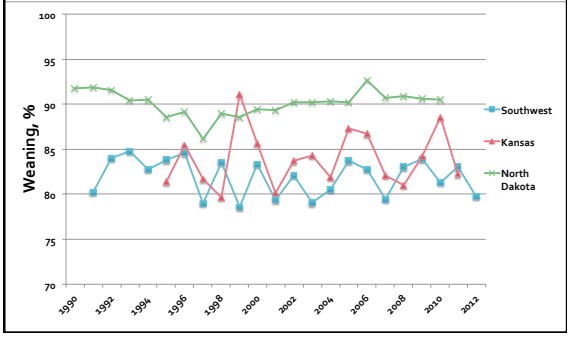
- Early sexual maturity
- High rate of reproduction
- Low rates of dystocia
- Longevity
- Minimum maintenance requirements
- Ability to convert forage resource to pounds of calf / beef

Dickerson, 1970

Weaning Weight in Commercial Cow/Calf Operations



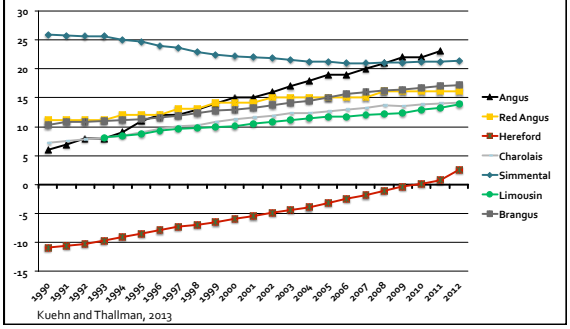
Weaning Rate in Commercial Cow/ Calf Operations



Matching or Changing?

Milk

Genetic Trend for Milk

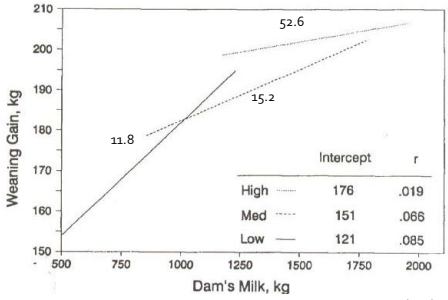


Kuehn and Thallman, 2013

Milk vs Maintenance

- More milk = higher year-long maintenance requirements (NEm)
  - Ferrell and Jenkins, 1984
  - Montano-Bermudez et al., 1990
- Related to greater visceral organ mass relative to empty body weight
  - Rumen, small and large intestine, liver, heart, kidneys
  - Ferrell and Jenkins, 1988

Relationship of milk production to calf WW



Lewis et al. (1990)

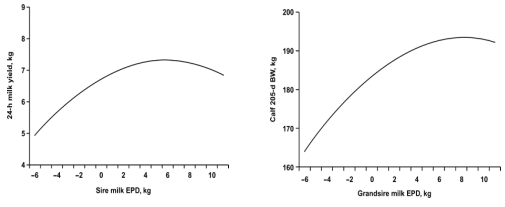
Effect of milk yield on conversion of milk to calf gain

	Level of milk	
	High	Low
Lewis et al., (1990)		
Total Milk Yield, kg	1,600	875
Ratio of TMY/WW (kg/kg)	52.6	11.8
Clutter et al., (1987)		
Total Milk Yield, kg	1,718	1,157
Ratio of TMY/WW (kg/kg)	31.3	18.9
Mallinckrodt et al., (1993)		
Total Milk Yield, kg	1,539	1,090
Ratio of TMY/WW (kg/kg)	43.9	29.1
Average		
Total Milk Yield, kg	1,619	1,041
Ratio of TMY/WW (kg/kg)	42.6	20.0

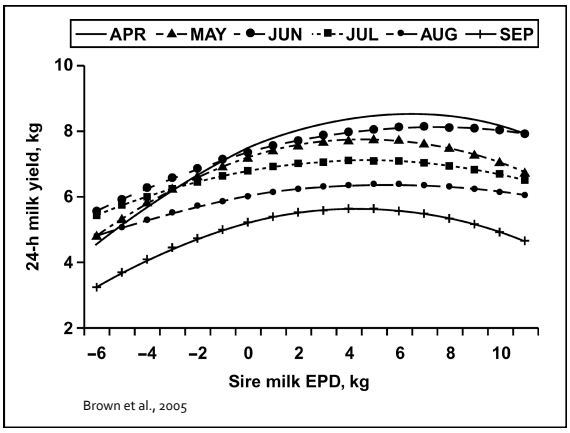
Consider:

Is there a limit of milk production that YOUR forage can support?

Effect of milk EPD on calf WW and TMY



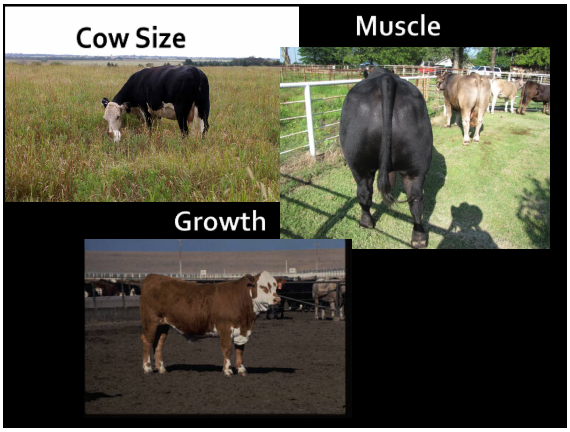
Brown et al., (2005)



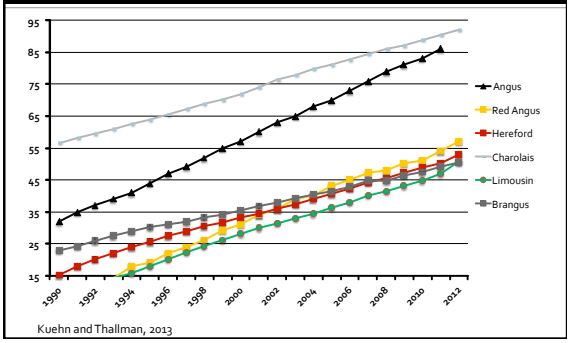
Increasing risk/frequency of cases where:

a) forage resources limit the expression of genetic potential for milk

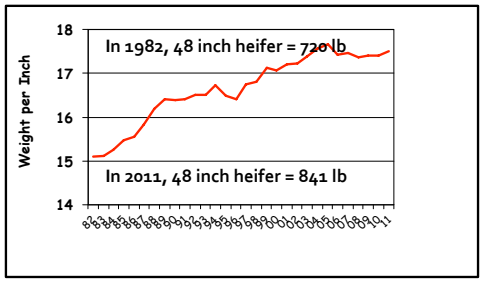
b) production costs have increased because the "environment" has been artificially modified to fit the cows



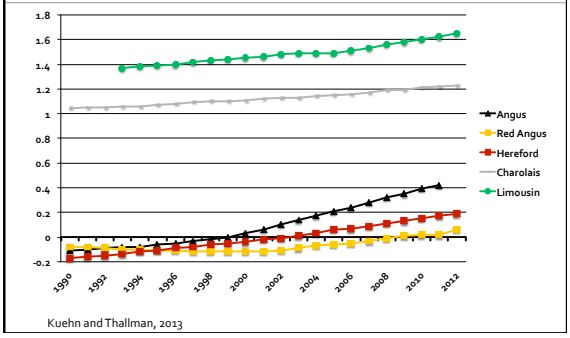
Genetic Trend for Yearling Weight



Weight per Inch of Height Yrlng Angus Heifers



Genetic Trend for Ribeye Area

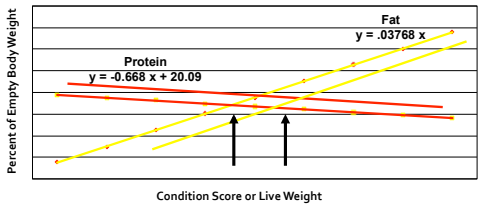


How will continued aggressive selection for muscle impact commercial cows' "matching" ability?

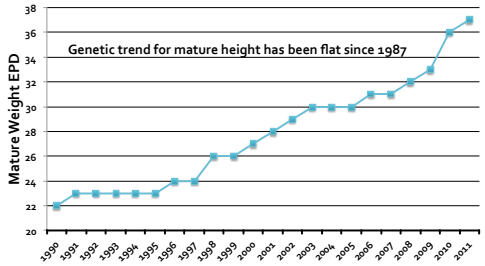
- The answer is not clear
- Minor increase in NEm
  Ferrell, 1988
- Increased mature weight
  MacNeil, 1984
- More muscle = less fat at same live weight
- "Undesirable associations between maternal traits and retail product appear to be mediated through fat thickness"
  Tess, 2002
- Lower adipose composition is associated with:
  - Older age at puberty
  - Lower conception rate
  - Lower calving rate

  Splan et al., 1998

Body Composition by BCS and Live Weight

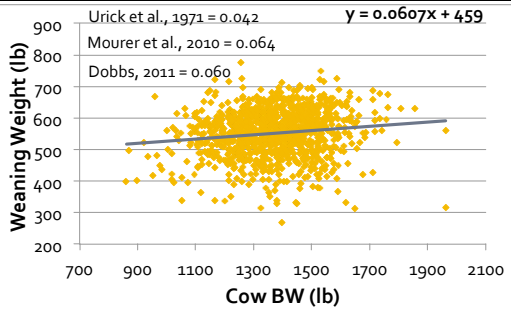


Genetic Trend For Mature Weight Angus



Do bigger cows wean bigger calves in a restricted environment (commercial herds)?

Calf WW vs Cow BW



Sensitivity Analysis

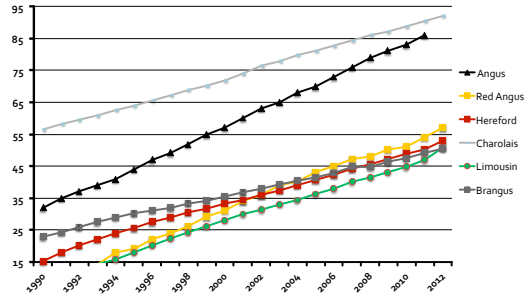
Value of Added Gain ($/cwt)	Value of Added Income[1] ($/cwt)
0.80	4.86
1.00	6.07
1.20	7.28

[1]Based on 6.07 lb additional weaning weight per 100 lb of cow weight

Annual cost / 100 lb of additional cow BW = $42
(Doye and Lalman, 2011)

Growth and Feed Intake

Genetic Trend for Yearling Weight



Kuehn and Thallman, 2013

Beyond cow size, how does continued aggressive selection for growth impact commercial cows' "matching" ability?

A nutritionist's view of selection for growth and associated feed efficiency

- High growth cattle
  - Eat more feed: more calories left over for growth (NEg) after NEm has been met
  - NEm is lower
  - Efficiency of feed used for growth (NEg) is "better"
- There is a positive genetic correlation between growth and feed intake

Arthur et al., 2001

Growth and Feed Intake

- Increased feed intake and gut capacity results in increased visceral organ mass relative to live body weight (yes, just like milk)
- The GI and liver make up less than 10% of the cow's body mass
- The GI and liver combine to use 40 to 50% of total energy expenditure in a beef cow

Ferrell, 1988

- **Could continued selection for growth and "capacity" be a contributing factor to the high cost of maintaining beef cows?**

"Belly draggers are not always more efficient cows. Most of the time, our deeper ribbed cattle consume more than average on a daily basis, and they don't gain enough to pay for the extra consumption."

Lee Leachman

What we have been doing:

- Teaching guidelines based on conditions that reflect a nutrient status that maximizes reproductive performance
- A major limitation is focus on short term effects with little consideration of long term implications

"Feeding to maximize reproductive rate does not result in differential retention between females with high and low feed requirements. In contrast, managing cows under reduced feed inputs would more likely result in culling of cows with high feed requirement due to reproductive failure.

Furthermore, increasing the proportion of cows with reduced feed requirements may provide producers a margin of safety at times when feed resources are scarce or costly."

Dr. Andy Roberts USDA ARS Miles City Montana

Indicators

- Fertility (calving or weaning rate)
- Body condition at calving and weaning
- Pasture or range condition
- Supplemental feed amount and cost
- Calf characteristics
  - Weaning weight
  - Price (avoid discounts and/or secure premiums)
  - Efficient post weaning growth
  - Carcass size, quality, and yield

Improving "Match" (without increasing inputs)

- Requires long term commitment
  - Moderate size, milk and muscle
  - Cull open cows
    - Be willing to challenge them
    - Resist the temptation to gradually modify the environment
  - Keep only early-born heifers
  - Keep only early-bred heifers
  - Buy (or keep) bulls out of cows that always calve early
- Tools available
  - RADG, RFI, Feed Intake, ME, Longevity, Stayability
  - Selection indexes for maintenance and profit
  - Optimal Milk Module

Improving Reproductive Efficiency

- Find source of seedstock that:
  - Puts **PRIORITY** on ERT's related to fertility and forage use efficiency
  - Culls open cows
  - Keeps only early-born heifers
  - Keeps only early-bred heifers
  - Puts environmental pressure on their cattle – weed out those that do not "match"
- Purchase bulls out of cows that are **managed like yours are or worse**, have never missed a calf, and calve early

"To breed for optimum means to have a target in sight beyond which you don't want to go. If your goal is to maintain an optimum level for any trait, the evidence of your accomplishment is not visible change, but lack of it."

Dr. Rick Bourdon

Summary

- No strong evidence that commercial cow efficiency has improved ("sell at weaning" context)
- From a commercial cow/calf perspective, the industry is on an unsustainable path relative to some traits
- Cows are big, and we can't get enough milk or muscle
- The result: feed inputs/costs per cow/calf unit are increasing while limited data suggests that production is not
- Relatively new tools are available that will help, however these must become a priority in selection decisions and not considered secondary traits