Cow Feed Efficiency Unknowns, Including Utilization of Range Forages

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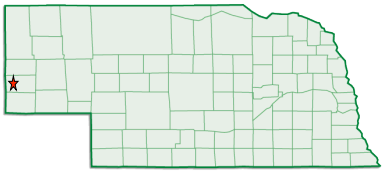
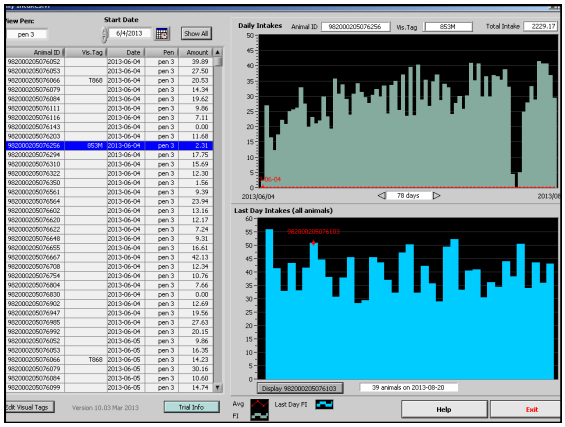
Olsen Ranches, Inc.

Banner County, NE





Why Test for Efficiency?

- Bob Weaber (2011) estimated that a 10% improvement across the entire feedlot industry would reduce feed cost $1.2 billion in 2011
- A 1% improvement in feed efficiency has the same economic impact as a 3% increase in rate of gain
- Feed cost are large portion of beef production
  - Feedlot
  - Backgrounding
  - Cow/Calf

Cow Efficiency

Importance of Cow Feed Efficiency

≈70% of feed resource for the cow herd

≈70% of feed resource for maintenance

≈50% of all feed is used to maintain the cow herd

Doubts of Feed Efficiency Testing

- Environmental Effects
  - Confined space versus rangeland
  - Pen mate competition
- Growth curve
- Age and hormone effects
- Grazing versus bunk feeding
- Diet
  - Forage versus concentrate
  - Fill regulated or energy feedback
- Gain versus maintenance
- Gain versus milk

Efficiency

- Input divided by output (or vice versa)
  - Example is Feed / Gain

Cow Efficiency

- A cow must convert the forage resource she is given to a high value calf.

What is an efficient cow?

Cow Efficiency (output)

- Must grow enough early to get pregnant early for her first calf
- Low rates of dystocia
- Rebreed annually for multiple years
- Produce pounds of a marketable calf
  - Minimal sickness
  - Efficient growing calf
  - High quality beef product at harvest

Cow Efficiency (input)

- Forage resource
  - Grass
  - Winter grazing
  - Harvested feed

Cow Efficiency

- Thus Cow efficiency is a whole life cycle

$$\frac{A + B + C + D + E + F + G + H}{X + Y + Z}$$

INDEX

Genetics

- AHA National Reference Sire Program
  - Over 200 sires tested
  - Over 10,400 progeny with data
- Olsen Steers tested in GrowSafe facility
  - 71 sires
  - 1777 steer progeny

Genetics

- Actual Data from June 14, 2012 to August 25, 2012 test (72 day)
- AI sired steers out of 4 year old or older cows
- 13 sires
- 209 steers

Genetics

- ADG 5.02 lb/day
- In value of $1.45 /lb
- Out value of $1.35 /lb
- Feed Cost $283.02 /DM ton

Table 1. Value Change of Steers Fed Through the Olsen GrowSafe Facility June 14, 2012 Through August 25, 2012.

Sire	In Weight	In Value @ $1.45/lb	ADG
A	759	$1100.77	5.43
B	718	$1041.31	5.25
C	740	$1072.65	5.27
D	728	$1055.37	5.20
E	680	$986.48	4.81
F	706	$1023.37	4.93
G	733	$1063.21	5.03
H	685	$993.03	4.71
I	678	$982.56	5.07
J	731	$1059.23	4.88
K	764	$1108.41	5.01
L	727	$1053.88	4.70
M	747	$1083.56	4.80

Value Change of Steers Fed Through the Olsen GrowSafe Facility June 14, 2012 Through August 25, 2012.

Sire	In Weight	In Value @ $1.45/lb	ADG	Out Weight	Out Value @ $1.35/lb	Feed Cost @$283.02 / DM ton	Value Change
A	759	$1100.77	5.43	1148	$1550.16	$295.33	$154
M	747	$1083.56	4.80	1094	$1476.36	$287.96	$105

- Similar Beginning Weight
- Large difference in ADG
- Extra gain offset the extra feed cost

Value Change of Steers Fed Through the Olsen GrowSafe Facility June 14, 2012 Through August 25, 2012.

Sire	In Weight	In Value @ $1.45/lb	ADG	Out Weight	Out Value @ $1.35/lb	Feed Cost @$283.02 / DM ton	Value Change
E	680	$986.48	4.81	1025	$1384.13	$263.61	$134
I	678	$982.56	5.07	1042	$1406.19	$299.75	$124

- Similar Beginning Weight
- Large difference in feed cost - $36.14
- Feed cost far exceeded extra gain

Genetics

- Moderate to High heritability for change
  - Phenotype
  - Marker Assisted
- Marker Base estimates of heritability
  - Four populations of beef cattle
  - 847 Hereford cattle in 10 contemporary groups
  - Population specific

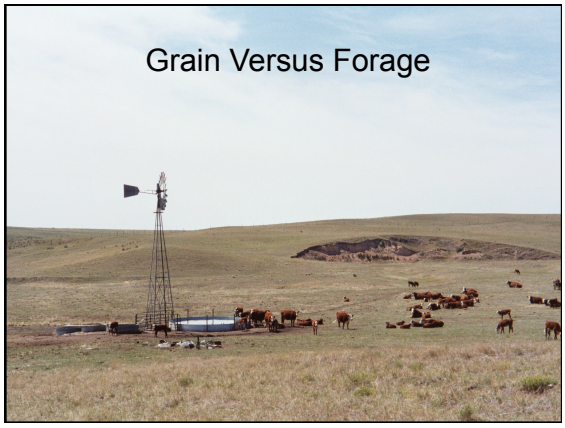
Marker-base estimates of heritability (h^2) for ADG, DMI, MMWT and RFI

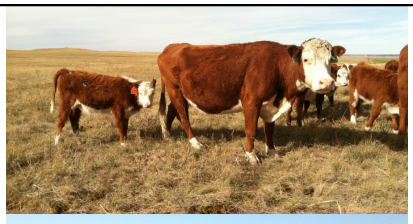
Breed	DMI (lb) h^2	MMWT ($lb^{.75}$) h^2	ADG (lb/d) h^2	RFI (lb/d) h^2
Hereford	.41	.50	.27	.45
USMARC	.35	.47	.30	.49
Simmental x Angus	.27	.48	.23	.32
Angus	.35	.49	.19	.21

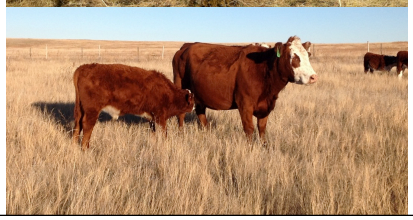
ADG: average daily gain, DMI: dry matter intake, MMWT: mid-test metabolic body weight, and RFI: residual feed intake.

Saatchi et al.: QTLs associated with dry matter intake, metabolic mid-test weight, growth and feed efficiency have little overlap across 4 beef cattle studies. BMC Genomics 2014 15:1004

Grain Versus Forage







Management Efficiency

- Match genetics to your goals and resources
- More Growth equals ?
  - Breed trends versus Feedlot or Commercial cow/ calf performance
- More Milk equals ?
  - Weaning rate
  - Breed trends
- More Muscle equals ?

Opportunity

- Genomic research
  - Health as it relates to efficiency
  - Genomic abnormalities and embryonic death
  - Weaning rate
- Continued testing of phenotypes
- Better data sets to compare cow lifetime productivity

So What?

- Room for improvement in production efficiency and specifically feed efficiency
- Careful evaluation of growth, muscle, and milk in the cow herd
- Improve digestion, metabolism, or health
- Selection for feed efficiency does not appear to have negative effects on cow fertility and weaning rates

Summary

- Visual appraisal can not determine feed efficiency
- More feed intake data is needed
- Better evaluation of correlations to other traits with bigger data sets
- Index to combine traits

www.beefefficiency.org

National Program for Genetic Improvement of Feed Efficiency in Beef Cattle