Using Proven Genetics in an AI Program

D.J. Schafer[1], J.K. Haden[1], S.R. Bartholomew[1], M.T. Griffin[1], M.E. John[1], J.L. Parcell[2], and D.J. Patterson[3]

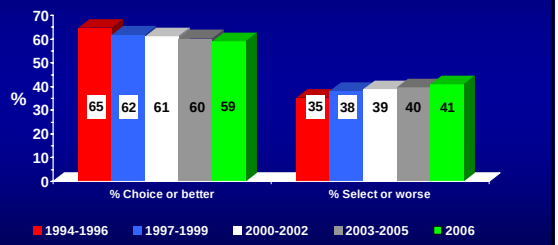
[1]MFA Incorporated, Columbia, MO
[2]Division of Agriculture Economics – University of Missouri
[3]Division of Animal Sciences – University of Missouri

Benefits of Estrus Synchronization & AI

- Induction of non-cycling females
  - older/heavier calves
- Concentrated calving season
- Fewer & better bulls
- Predictable growth
- ↑ carcass characteristics
- ↑ replacement females

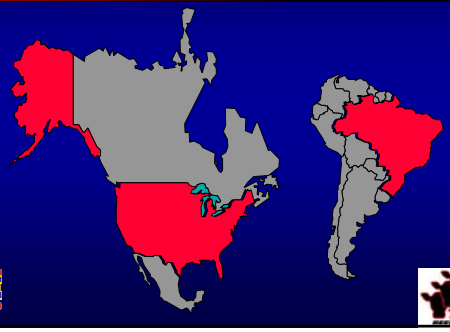
What has happened to the quality of beef produced in the U.S. over the last decade?

Breakdown of Beef Quality Grades

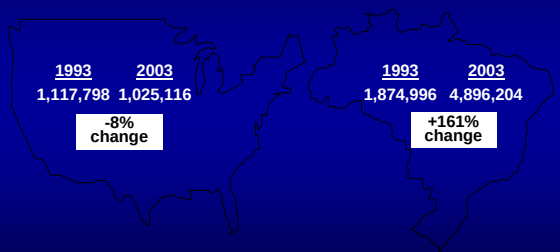


Source: USDA National Steer & Heifer Estimated Grading Percent Report

AI use in U.S. vs. Brazil



Import & Domestic Semen Sales

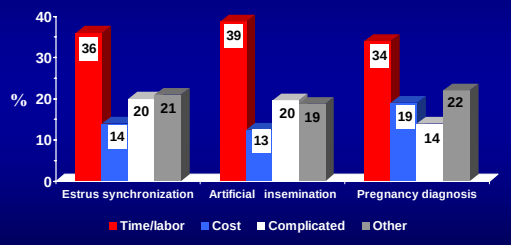


NAAB, 2003; ASBIA, 2003

The Future of the U.S. Cattle Industry

Unless actions are taken in the U.S. to remain the premier supplier of quality beef, what will be our future position in the global marketplace?

Reasons for Slow Adoption of Reproductive Technologies



Source: NAHMS Survey 1998

What is the annual cost of bulls?

Feed Costs *(Brees and Horner; MU Extension)*	
Pasture	$140
Harvested Forage	$160
Supplements	$26
Salt and Mineral	$20
Total Feed Costs	$346
Other Cost *(Johnson and Jones; KSU Extension)*	
Labor	$50
Vet	$40
Repairs	$31
Misc.	$7
Total Other Costs	$128
Total Variable Costs	$474

What is the annual cost of bulls?

Total Variable Costs	$474
Bull to Cow Ratio	
1:20	$23.70
1:25	$18.96
1:30	$15.80
1:40	$11.85
1:50	$9.48

Cost of estrus synchronization & AI

Prescription drugs	$8.96
CIDR	$9.02
Semen	$14.00
Supplies	$0.50
Labor	$8.75
Cleanup bulls	$9.48
Total costs	**$50.71**

Cost Comparison

Cost of AI	$50.71
Cost of Natural Service (1:25 ratio)	$18.96
Difference	$31.75
Genetic Selection (10 lbs. @ $100/cwt.)	$5.00
Remaining Difference	$26.75
10 days older; 2.0 lbs./day; @100/cwt.	$20.00
Remaining Difference	$6.75

Filling the gap

$6.75/cow to be recovered by

- Concentrated calving season
- Fewer & better bulls
- ↑ carcass characteristics
- ↑ replacement females

No difference in cost

Perhaps part of the reason for limited use of AI is due to the unknown economic incentive that may result from using proven genetics.

Football Analogy

- You are the G.M. of an NFL expansion team
- Need to find a quarterback

Who do you want leading your team?

Peyton for $10M

Eli for $7M

Objective

- To determine and compare the economical impact of using
  - Natural service
  - AI to low accuracy sires
  - AI to calving ease sires
  - AI to high accuracy sires

Background

- Calves were the result of an experiment comparing fixed-time AI pregnancy rate resulting from two estrus synchronization protocols
- Four locations involved
  - MGA Select (72 hrs) 201/327 61%
  - CO-Synch+CIDR (66 hrs) 214/323 66%

Trial Overview

- Only steers were used
- Never implanted
- All calves were weaned according to MFA Health Track program requirements
  - 1st round of vaccinations given pre-weaning and 2nd round at weaning
  - Standardized nutrition post-weaning
  - Weaned a minimum of 45 days

Trial Overview

- Calves were weaned on the same day within each location
- All locations weaned within a 2 week period
- Fed at same feedlot and received on same day
- Assigned to pens by sire group and weight

Feedlot Nutrition

- 4 day acclimation period
- SLR/Corn (50:50) until 23 DOF
- SLR/Corn (25:75) until 57 DOF
- Corn/32% Protein (87:13) for duration

Feedlot Nutrition

- Harvested from 132 to 195 DOF (63 days)
- Harvested at same commercial packing facility individual carcass measurements collected
- Value of feeder calves and carcasses was determined using 3 year average values
  - To eliminate market variability

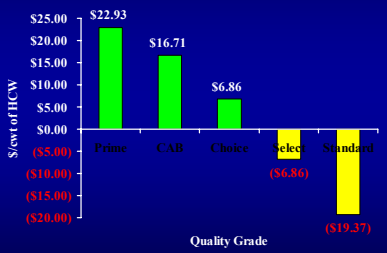
Definition of Sire Groups

- High Accuracy (HAS; n = 96)
  - Calves out of AI sires with production EPD Acc. ≥ 0.85 at the time of AI; used exclusively on cows
- Low Accuracy (LAS; n = 101)
  - Calves out of AI sires with production EPD Acc. < 0.85 at the time of AI; used exclusively on cows

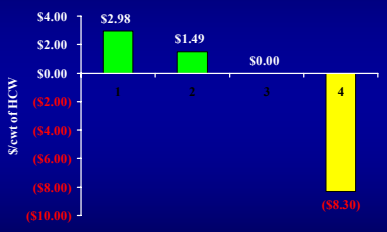
Definition of Sire Groups

- Calving Ease (CES; n = 38)
  - Calves out of AI sires with high accuracies at the time of AI but used exclusively on virgin heifers
- Natural Service (NS; n = 93)
  - Calves out of natural service sires following one round of artificial insemination

Quality Grade Premiums & Discounts



Yield Grade Premiums & Discounts



Net return differences of steers

	Net Return	HAS $/hd advantage
HAS	$70.50[x]	–
LAS	$19.81[y]	$50.69
CES	$16.66[yz]	$53.83
NS	($19.17)[z]	$89.66

Differences in replacement heifer value

- Based on those numbers, what is the lifetime value of the replacement heifer mates?

Average Lifetime (yr)	$/hd difference
4	$248.43
5	$306.08
6	$362.06
7	$416.40

Lifetime advantage of High Proof AI sired daughters over Natural Service

What if?

- Suppose you were going to feed cattle, or if you do, what would be an acceptable target?
  - 10% Prime
  - 50% CAB or better
  - 90% Choice or better
  - With an average YG of 3
  - Weighing 1100 lbs
  - At 15 months of age

It can be done

- The entire calf crop out of the HAS group that was used at 3 of the locations finished
  - 16% Prime
  - 67% CAB or better
  - 100% Choice or better
  - With an average YG of 2.48
  - Weighing 1115 lbs
  - At 13.6 months of age

Putting Things into Perspective

The entire calf crop out of the HAS group, if entered, would have finished 3rd in the steer division of the National Angus Carcass Challenge at $106.42/cwt

Conclusions

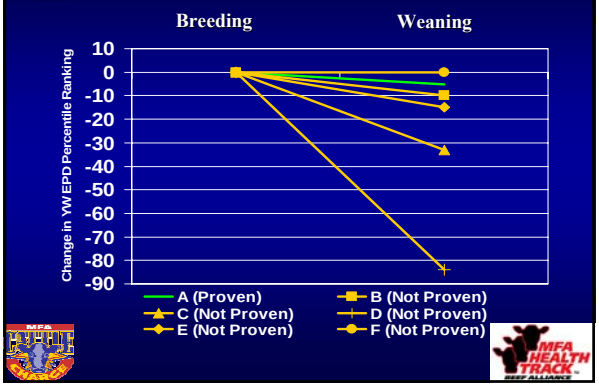
AI to sires with high EPDs accuracies provides the opportunity to increase profitability and marketability of terminal and breeding stock

AI to sires with high accuracies offers the greatest probability of making improvements to the traits for which selection pressure is applied

Implications

Imagine the benefit to the beef industry as a whole if the use of AI were to increase from 10% to ……

Don't take the bait



Do what makes sense

Make breeding decisions that:

1.) Minimize risk

2.) Maximize returns

3.) Allow for flexibility

REMAIN DISCIPLINED

Acknowledgements

- Work supported by the USDA Rural Development Value Added Producer Grants program

- Dr. Monty Kerley
- UMC Thompson Farm
- Forage Systems Research Center
- Greenley Research Center
- MFA Research Farm
- UMC South Farm