

**Genetic Decisions to Meet
Beef Industry Needs**

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IMPORTANT DECISIONS

1. Production & Product Goals
2. Repro, Production & Product
3. Seedstock Supplier
4. Crossbreeding / Straightbreeding
5. Using the Database

Production & Product Goals

- A. Production
 1. Calves , Yrlgs, Finished Steers
 2. Mainstream vs. Speciality Mkt.
 3. Flexibility
- B. Product
 1. Yield Grade 2.5-3.5
 2. Low Choice to High Select

Beef Carcass Market Goals

- Retail Beef = Choice- & Sel +, Y2 & Y3
- High Marbling = Choice + or >
- High Lean = Y1 & Y2 , Sel
- Speciality = Guaranteed Tender, Organic, Grassfed, Natural, Export

Carcass Target Market

- Document Present Carcass Performance
- Study Alliances & Grids
- Economic Impact of Carcass vs. Production & Reproduction Traits
- Monitor Correlated Traits to Prevent Slippage

Balancing Reproduction, Production & Product

Heritability of Reproduction Traits

about 20%

- Conception rate
- Calving rate
- Calving ease

Heritability of Production Traits

about 30 to 35%

- Birth , Wean, Year. Wts.
- Feed Intake
- Feed Conversion
- Mature Wt. ~ 50%

Heritability of Product Traits

about 40%

- Fat
- REA
- Cutability
- Marbling
- Shear ?

Carcass Traits Can Be Changed Genetically

- Carcass Databases Are Essential
- Use High Acc. Carcass EPD Sires
- Consider Ultrasound / Ultrasound EPD's

Genetic Antagonisms

- Calving ease & Birth wt. -.74
- Marbling & Cutability -.25
- Marbling & Year. wt. -.33
- Marbling & REA -.21
- Marbling & Backfat .35
- Marbling & Shear -.31 ?

Carcass Traits can be changed Genetically

**But at what price in terms of
Reproduction & Production ?**

**Genetic Correlations Between
Reproduction & Product Traits**

<u>Female Trait</u>	<u>Fat Trim</u>	<u>Retail Product</u>
Age Puberty	-.29	.30
Services / Conc.	.21	.28
Calv. Difficulty	-.31	-.02
Birth Wt.	-.07	.30
Mature Wt.	-.09	.25

**Genetic Correlations /
Genetic Antagonisms**

**Preventing One Step Forward
and
Two Steps Backward**

Relative Economic Values

Trait Category

Reproduction-Production-Product

- Willham = 10-2-1
- Melton (Ind. Integrated) = 2-6-1
- Melton (Trad. Cow- Calf) = 7-1-1

An "Industry Integrated" operation will have a much different optimum mix of traits (reproduction, production, product) than will a "Traditional Cow Calf" operation.

Standardized Selection Emphasis

	<u>Ind. Integ.</u>	<u>Cow-Calf</u>
• Repro.	31	47
• Prod.	29	23
• Product	40	30

Economically Relevant Traits

- Sale Wt
- Probability of Calving Ease
- Cow Maintenance Feed
- Stayability
- Heifer Pregnancy Rate
- Tenderness
- Days to Target
- Docility

Economically Relevant Traits (ERTs) vs. Indicator Traits

• Example:

Calving Ease Vs. Birth Wt.

Economically Relevant Trait

Indicator Trait

Probability of Calving Ease

Calving Ease Score
Birth Weight
Gestation Length
Calf Shape
Cow Pelvic Area

Economically Relevant Trait

Indicator Trait

Cow Maintenance
Feed Requirement

Mature Cow Wt.
Body Cond. Score
Milk Production
Gut Wt.

EPD's Available in Angus, Red Angus, Gelbvieh, Limousin & Simmental Cattle

Birth Wt, Wean Wt, Year Wt , Milk, Total Maternal, Year Ht, Mature Wt, Mature Ht, Scrotal Cir, Carcass Wt, Marbling, REA, Fat, US IMF%, US REA, US Fat, Retail Product %, Stayability, Heifer Preg Rate, Gestation Length, Calving Ease, Maternal Calving Ease, Docility

Necessity EPDs (probabilities)

- 42 day Breed Back
- Low imput growth
- No Treatment (Resp, Ft Rot, Pk eye)
- Calf Nurse w/ 1 hr.
- 60 d. Post-Wean Fleshing ability
- Normal Toe Growth
- Hair Grow/Shed Score
- Small Teat Size
- Docility/ Temperament

Choosing a Seedstock Supplier

1. Philosophy & Integrity
2. Breeder or Multiplier
3. Database for ERT's
4. Marketing Services

Database Management

- 1. Monitor Results and Adjust**
- 2. Access to a sizeable, complete database will be the primary driver of genetic improvement.**

Selection Indices to Improve Carcass Traits

- Most Effective Way to Achieve Balanced Trait Selection**
- Best Way to Deal with Antagonisms**
- Economic Weights Difficult to Establish**

Selection Indices and EPDs will be Calculated for Specific Endpoints

- Angus Sire Alliance (Circle A)**
- Future Beef Operations EPD**
- Breed Object (Australia)**

**Whole Herd Reporting of Data
Will Become the Industry
Standard**

**CROSSBREEDING: THE
FORGOTTEN TOOL ?**

PLANNED CROSSBREEDING

- BREEDS TO USE (SOURCE OF BULLS) ?
- MANAGEMENT EASE ?
- RAISE REPLACEMENTS ?
- MARKET GOALS ?
- HEIFER MATINGS ?
- HERD SIZE ?

CROSSBREEDING AS A TOOL

- CROSSBREEDING CAN INCREASE PRODUCTIVITY 20 %
- TRADITIONAL SYSTEMS DIFFICULT TO MANAGE
- SIMPLIFIED SYSTEMS EASE MANAGEMENT
- CROSSBREEDING CAN BE USED TO REDUCE VARIATION

TRADITIONAL CROSSBREEDING

SYSTEM	%ADVANTAGE
• 2-BREED ROTATION	16
• 3-BREED ROTATION	20
• ROTA-TERMINAL	24

SIMPLIFIED CROSSBREEDING

SYSTEM	%ADVANTAGE
• SIRE BREED ROTAT.	16
• MULTIPLE SIRE BREEDS	15
• COMPOSITE	15
• BUY REPLACEMENTS STATIC TERMINAL SIRE	28

One Type/Size Does Not Fit All !

Terminal Selected Continental Bull

X

Maternal Selected British Cow

DOES NOT = Maternal Excellent
Crossbred Cow

**Crossbreeding or
Straightbreeding ?**

- 1. Set Goals & Market Endpoint**
- 2. Use Breed Differences**
- 3. Limit Number of Breeds**
- 4. Fit Cows to Feed Base**
- 5. Fit Bulls to Market**

**ABANDON CROSSBREEDING
TO ACHIEVE UNIFORMITY ?**

**THE REDUCTION IN
VARIATION WILL BE VERY
SMALL AND MAY NOT
OFFSET THE DRAWBACKS**

**CROSSBREEDING SYSTEMS
THAT MANAGE BREED
COMPOSITION CAN REDUCE
VARIATION**

**CHASING PRODUCT
UNIFORMITY AT THE
EXPENSE OF LOSING
HETEROSIS AND
COMPLIMENTARITY
IS A MISTAKE !**

**STACKED PEDIGREES WITH A
LEVEL OF INBREEDING
WILL PRODUCE CALVES
WITH LESS VARIATION**

Consistency and Uniformity

- Eliminating the “out” Cattle Will Pay
- Extreme Genetic Uniformity Not Needed
- Sorting Technology Considered

Uniformity and Consistency

How can a cow herd produce consistency when it is the result of continual change - - - A sorted by-product of different types ?

Summary

- **Identify Endpoint**
- **Focus on ERT Traits**
- **Avoid Single Trait Selection**
- **Avoid Extremes**
- **Consider Seedstock Source**
- **Consider Crossbreeding**
