Beef Improvement Federation

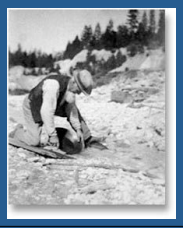
Improving the beef industry through performance evaluation

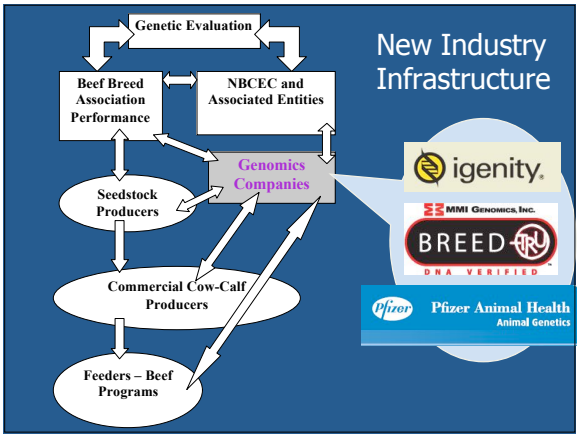
Breed and Breeder Adaptation to Genome-Enhanced/Enabled Selection Information

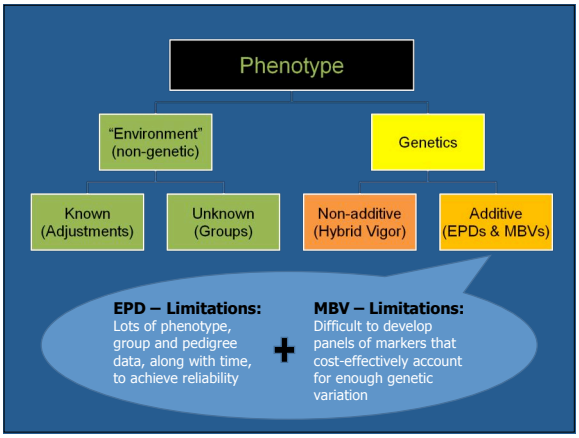
Kent Andersen – U.S. Beef Breeds Counsel and the North American Limousin Foundation

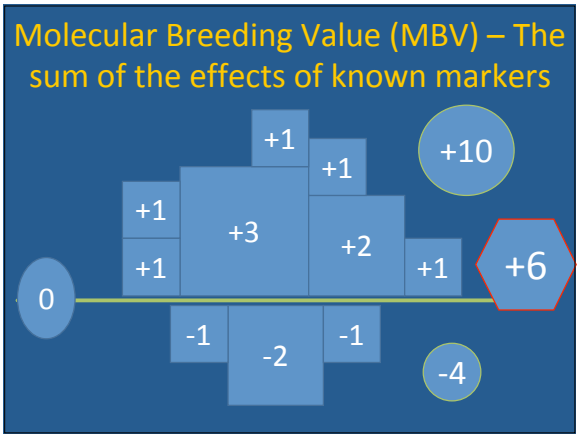
"Is There Gold in Those Genomes?"

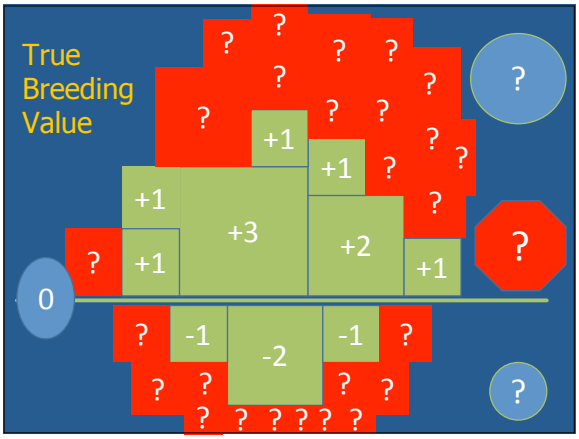
- Breed and Breeder Adaptation to Genome-Enhanced/Enabled Selection Information
  - Adoption – relatively seamless or confusing and cumbersome?
  - EPDs and MBVs (MVPs, MGVs)
  - Accuracy
  - Indexes and decisions
  - Trade
  - Costs and returns

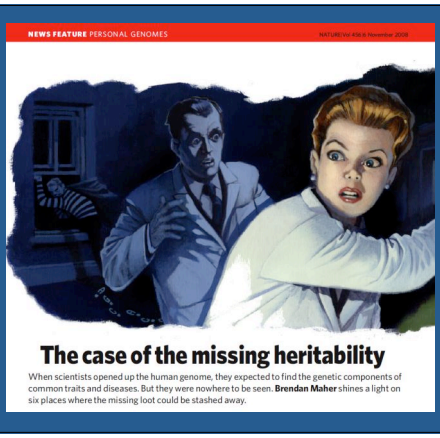












Genome-Based Diagnostics

MBV Enhanced

- Traits – EPDs & MBVs
  - CED, CEM
  - BW, WW, YW, MW
  - MA, HP, SC, ST, ME
  - DOC
  - CW, REA, FAT, MARB

MBV Enabled

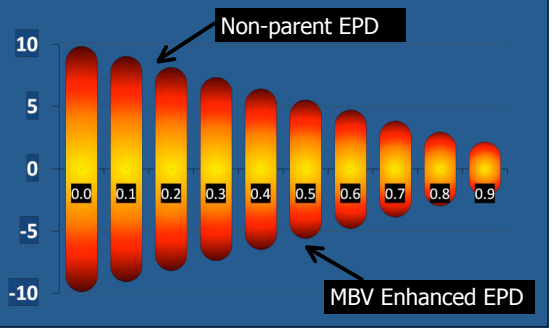
- Traits – MBVs
  - Feed Utilization
  - Animal Health
  - Tenderness
  - Beef Healthfulness
  - Adaptability
  - Cow Fertility and Productivity

New Selection Paradigm
Risk Mitigation

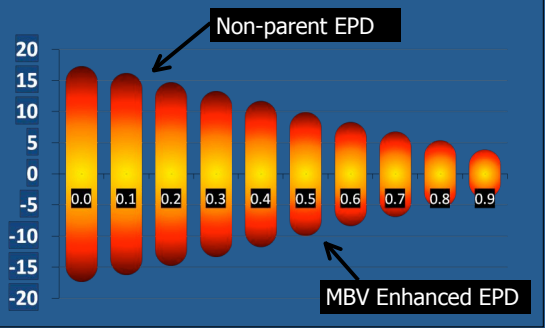
Table 1. Limousin Possible Change Values (+ or –) for EPDs of Various Traits

BIF Accuracy	CE Direct (%)	Birth Wt. (lbs.)	Weaning Wt. (lbs.)	Yearling Wt. (lbs.)	Milk (lbs.)	CE Maternal (%)	Scrotal (cm)	Stayability (%)	Docility (%)	Carcass Weight (lbs.)	Ribeye Area (in²)	Marbling Score (units)
0	8.6	3.0	16.2	24.7	14.8	8.9	.70	8.6	15.8	36	.46	.24
.1	7.8	2.8	15.0	22.0	13.7	8.0	.62	7.7	14.3	32	.41	.22
.2	6.9	2.5	13.4	19.4	12.2	7.1	.56	6.9	12.7	29	.37	.20
.3	6.1	2.2	11.7	16.8	10.8	6.2	.49	6.0	11.1	25	.32	.17
.4	5.2	1.9	10.0	14.2	9.2	5.3	.42	5.2	9.5	22	.28	.14
.5	4.3	1.6	8.1	11.5	7.4	4.5	.35	4.3	7.9	18	.23	.12
.6	3.5	1.3	6.4	9.0	5.8	3.6	.28	3.4	6.3	14	.18	.10
.7	2.6	1.0	4.8	6.4	4.3	2.7	.21	2.6	4.8	11	.14	.07
.8	1.7	0.7	3.2	3.9	2.9	1.8	.15	1.7	3.2	7	.09	.05
.9	0.9	0.4	1.5	2.1	1.4	0.9	.08	0.9	1.6	4	.05	.02

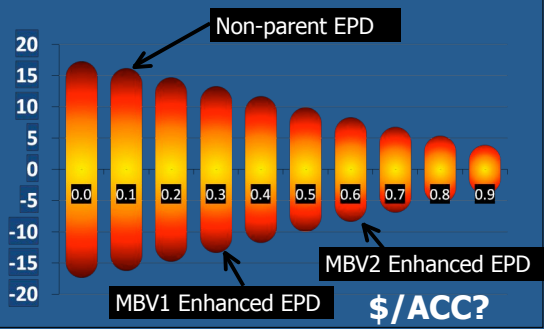
Calving Ease – Possible Change Associated with Increasing Accuracy



Milk – Possible Change Associated with Increasing Accuracy

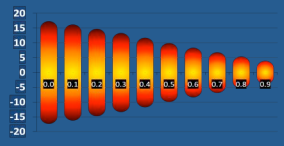


Stayability – Possible Change Associated with Increasing Accuracy

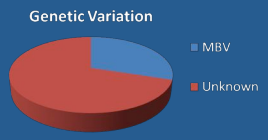


Accuracy/Reliability – EPD/MBV

EPD – Error due to lack of sufficient progeny with performance data



MBV – "Error" of omission due to proportion of genetic merit not explained by marker panel



Overloaded or Empowered?

Predictors	Traits
Conventional EPDs	Twenty or more traits with EPDs & ACCs, as well as MBVs & ACCs, from multiple sources
Multi-breed EPDs	
MVPs and MBVs	
Genomic - Enhanced & Enabled	**Integrated EPDs and MBVs, Indexes and Decision Tools**

"Leaders groove on ambiguity"

"…The next five years are going to be an economic roller-coaster ride. That means that business leaders are going to be challenged repeatedly not just to make fact-based decisions, but also to make some sense out of all of the conflicting and hard-to-detect signals that come through the fog and the noise. Leaders are the ones who can handle gobs and gobs of ambiguity."

Tom Peters

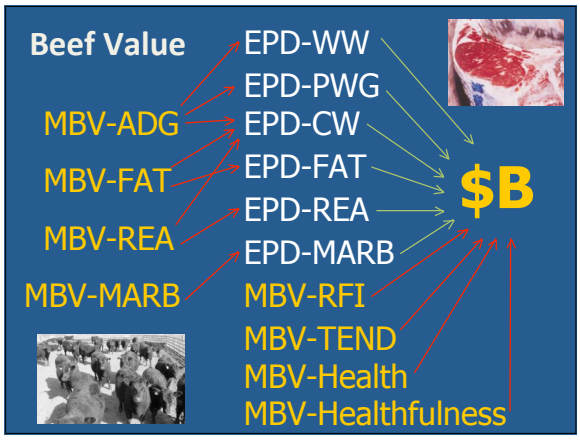
…but do breeders?

Breed & Breeder Adaptation to MBV Enabled ERTs - (Non-EPD traits)

MBVs – EPDs – Indexes and Decision Support
- – Feed Utilization
- – Animal Health
- – Palatability
- – Beef Healthfulness
- – Adaptability
- – Cow Fertility and Productivity

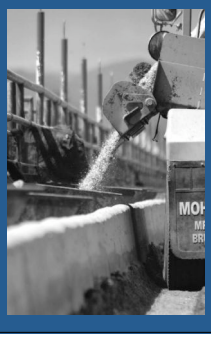
Beef Value ($B)

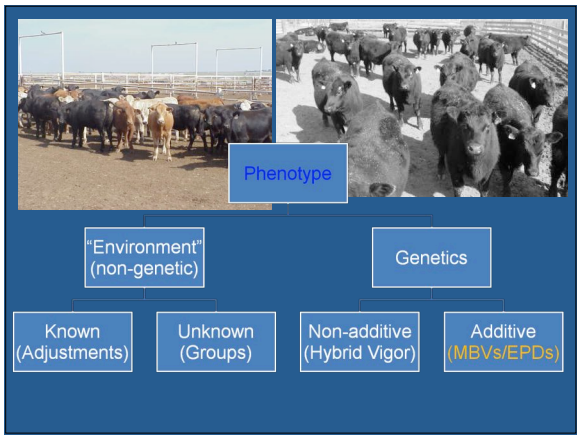
- Predicts differences in dollars per head from genetics for:
  - – Growth (PWG)
  - – Carcass value
    - Yield grade
    - Marbling
- Assumptions



Breed & Breeder Adaptation to MBV Enabled ERTs

- MBV efficacy, reliability
  - Validation
  - Assessment
- MBV economics
  - Value proposition
- MBVs for threshold traits
  - Diminishing returns





Match Genetics to Management and Markets

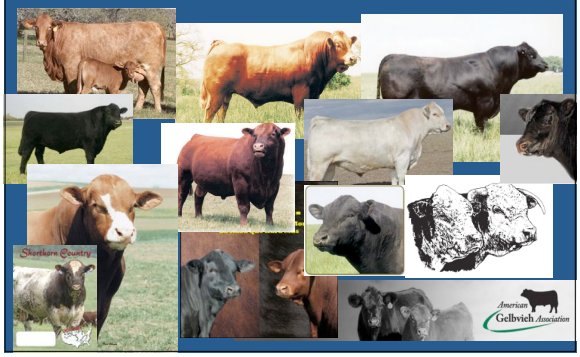
Price - Seedstock

- **Recording** – cow enrollments, registrations, A.I. service certificates, ultrasound scanning and ownership transfers - $30 to $50
- **Traditional testing** – parentage verification, simple recessive traits such as color, polled and/or one or more defects - $30 to $50
- **Genomics tests** for other traits - $50 to $100?
- **$150 to over $200** per head for recording and testing

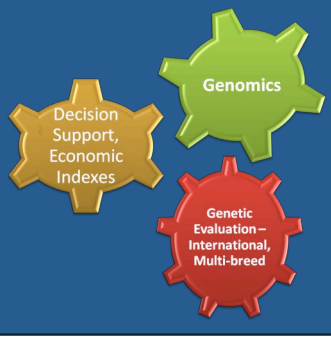
Genomics Gold

- Reduce Risk
  - More reliable predictions help minimize breeding mistakes
  - More comprehensive predictions lead to more profitable decisions
- Time and decisions equal gold
  - Two years - breeding to marketing yearling bull progeny
  - Four years - breeding to marketing first yearling bulls from daughters

U.S. Beef Breeds Counsel - Roles



Best-use of traditional and emerging genomics information to add prosperity to the industry…



Thank you

CALIFORNIA BEEF RUSH '09

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