

Opportunities for Capturing Additional Data in the US

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USDA is an equal opportunity employer

US National Cattle Evaluations (NCE)

- Most breeds using genotyping arrays
 - Angus over 0.6 million genotyped, 100,000+ yearly rate
 - Multibreed consortium (IGS) over 100,000 genotyped
 - Virtually all using a single step procedure
 - Refinement of pedigree relationship
 - Increased accuracy if close relationship to phenotypes
 - Across breed prediction not working well
 - Hypothesizing for multi-breed
 - Under this framework, what advancements can make the most impact?

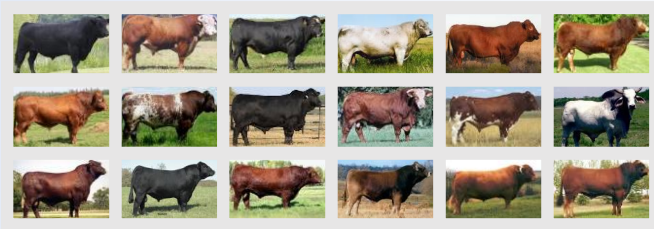
Potential areas to add accuracy

- Increased phenotyping
 - Current trait complexes with low record volume in seedstock
 - Trait complexes from commercial sectors
 - Economically important but not measured in broad seedstock sector
 - Carcass composition, feed intake, commercial cow longevity and fertility, disease incidence, range survival and fitness
- Knowledge of causal variation
- All require larger phenotypic databases than currently available

Germplasm Evaluation Program (GPE)

AI Sires:

AN, HH, SM, CH, AR, LM, GV, SH, BN,
BM, MA, BR, CI, SG, SA, BV, SD, TA



Dams:

AN, HH, SM, CH, AR, LM, GV, SH, BN,
BM, MA, BR, CI, SG, SA, BV, SD, TA



×

PB, BC & F₁ Steers



PB Bulls



PB, BC & F₁ Heifers



×

Natural Service PB, BC, & F₁ Steers & Heifers

GPE Trait emphases (red non-standard)

Calving

- Dystocia
- **Survival**

Growth

- Gestation Length
- Birth Weight
- Weaning Weight
- Postweaning growth
- **Mature weight, height, and condition**

Maternal

- Birth Weight
- Dystocia
- **Survival**
- Weaning Weight
- Milk Production

Carcass & Meat Quality

- **Shear force**
- **Cutability**
- Yield Grade factors
- Marbling
- **Color Stability**

Efficiency

- **Feed utilization of finishing steers**
- **Feed utilization of pre-breeding heifers**
- **Mature cow maintenance requirements**
- **Rumen microbial composition**

Reproduction

- **Heifer age at puberty**
- **Heifer pregnancy rate**
- **Cow pregnancy rate**
- **Fetal death loss**
- **Postpartum interval**
- **Male fertility**

Longevity

Disease Resistance

Adaptation

... and many more.

Role of GPE

- Breed differences (ABEPD program)
 - Industry snapshot
- Heterosis estimates
 - Targeting breed specific heterosis
- Genetic correlations (heritability)
 - Indicator and economically relevant traits
- Genomic discovery

GPE Limitations

- Environmental scope
 - One location – GxE interactions
 - Grand Challenge Program
- Size
 - 3,500 progeny/year
 - Biggest single research herd
 - Still limited in power for marker tests ($n < p$)
 - Particularly in single step context, large scale genomic predictions difficult

Commercial population data

- These are the real consumers of seedstock selection decisions
- Profit potential and decision support (indices) should be geared toward commercial producers
- Can we also identify ways to recover commercial data to inform seedstock decisions

Commercial data recovery

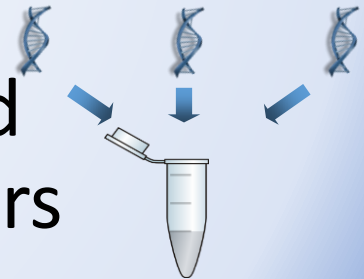
- Traditionally difficult to obtain
 - Cow/calf, stockers/growers, feedlot, abattoir
 - Sires often unknown (multi-sire mating)
 - Data not reliably collected on individuals
 - Relationships can be difficult to track

Commercial data recovery

- Genomics and single-step evaluation has the potential to alleviate these concerns
 - Direct ties to NCE
 - Group means may be useful (DNA pooling)
 - Especially when group means are different



- Need to incentivize data collection and cooperation with commercial producers





The IGS Feeder Profit Calculator (FPC)

02 March 2018

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Seedstock and commercial producers share their firsthand experience with ASA's new and innovative feeder calf value prediction.

By Emme Troendle and Lilly Platts



Historically, the primary limitation of valuing feeder calves has been accurately gauging the profit potential of the largest genetic group within the industry — the crossbred calf. International Genetic Solutions (IGS), a collaborative effort of numerous breed associations, has developed a tool to assist in determining feeder calf value, called the Feeder Profit Calculator™ (FPC).

Game Change

American Angus Builds Feeder Calf Program

11/20/2017 | 10:41 AM CST



By [Victoria G. Myers](#), Progressive Farmer Senior Editor

Connect with Victoria:



A new way to value feeder calves... more premiums to Angus... (DTN/Progressive Farmer)

All the details aren't in yet, but the American Angus Association (AAA) has taken an unusual step for a breed organization—buying Verified Beef this month. The third-party verification services program helps producers market feeder calves in niche markets, emphasizing things like animal identification and traceability.

The reason for the acquisition, according to AAA chief executive officer, Allen Moczygemba, is to create a feeder calf program that will be built on the use of registered Angus bulls.

"By marrying the advanced technology platform and

“Premium Red Baldy” Program Started by Hereford and Red Angus

Wyatt Bechtel

February 6, 2018 04:00 PM



Commercial cattlemen now have a multi-breed association backed program that will help better market cross bred females using Red Angus and Hereford genetics. (Troy Walz, University of Nebraska)

HEREFORD ADVANTAGE PROGRAM

Increase added marketing power and brand recognition with feeder cattle sired by a Hereford bull battery ranking in the top 50% for the \$CHB index.

Commercial application

- Knowing breed alone can facilitate management decisions (GPE)
 - Endpoint differences
 - Growth potential
 - Intake differences
 - Ration/days on feed/selling criteria
 - Marketing grid
 - Implanting/feed additive decisions
- Commercial EPDs could help even more

Application

- Feedlot buyer obtains lot of 100 animals
 - Unknown origin (sale barn)
 - Obtain blood or ear sample from each animal
 - Cost: < \$200 for DNA extraction
< \$100 for genotyping
 - Can \$300 (\$3/hd) be recovered?

Return on investment

- Value:

- Scenario 1: $\frac{1}{2}$ Charolais, $\frac{1}{4}$ Limousin, $\frac{1}{4}$ Angus

- High yield potential, carcass weight
 - Lower quality grade opportunity
 - 10 days less on feed, decreased feed and implant risk
 - Greater than \$10/hd return from changing strategy

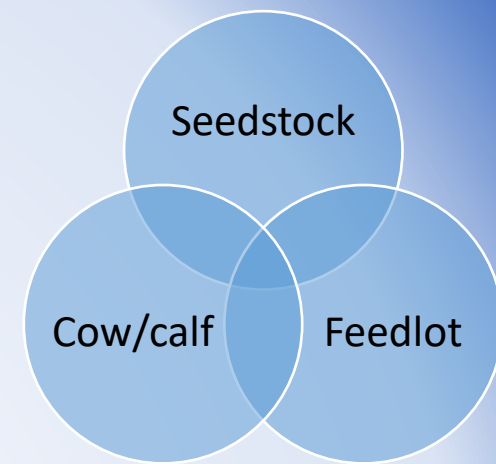
- Scenario 2: $\frac{3}{4}$ Angus, $\frac{1}{4}$ Hereford

- High quality potential
 - Carcass quality grid
 - Higher feed cost, \$10-\$25 more per cwt
 - Target ration to increased marbling potential

Commercial data recovery

- Improve genetic evaluations and commercial management with genomics
 - DNA Pooling as an interim strategy
 - Cheaper genotyping will open more possibilities
 - Genomically enhanced predictions of group
 - Databases:
 - National cattle evaluations
 - Could work with current commercial programs
 - More difficult with crossbred pools
 - May require fee structures/collaborative agreements
 - Commercial producers
 - Commercial databases – record pool performance
 - Could predict future pools using own data
 - Tie together time and space to increase accuracy

Databases

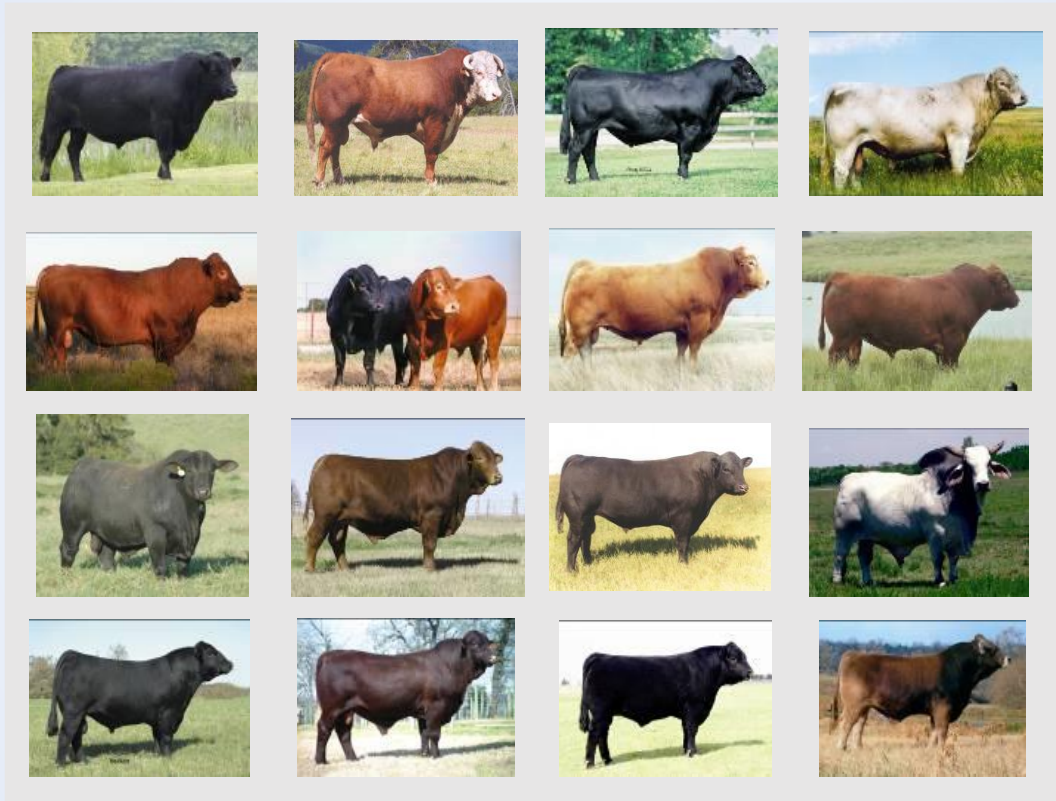


- Most optimal solution (my opinion)
 - Develop agreements to share data across as many databases as possible
 - Synergistic relationship
 - Data from commercial sources would inform seedstock selection decisions
 - Seedstock genomic information and infrastructure would inform decisions in commercial sector
 - Data gathering in current structure of beef sector could be improved dramatically

Conclusions

- Current commercial marketing programs would benefit from utilizing genomic relationships to performance databases
 - Trace back to sires that contribute to groups
 - Eventually genomically enhanced performance prediction
- Synergistic agreements would be highly beneficial and should be explored
- Similar tools could inform design and analysis of applied research programs

Questions



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