

BIF sub-committee report on across-breed EPD programs: proposed improvements

Larry Kuehn

USDA, ARS, U.S. Meat Animal Research Center

The USDA is an equal opportunity employer

Outline

- Discussion of current state of the ABEPD system and possible changes
- Update on current sampling and progress in the USMARC Germplasm Evaluation Program (GPE)

ABEPD program breed differences

- Across-breed EPD program
 - Estimate breed differences from GPE using a sire and dam model (F_1 progeny records)
 - Adjust records for bull EPD

$$B_i = USMARC_i / b + (EPD_{i,YY} - EPD_{i,USMARC})$$

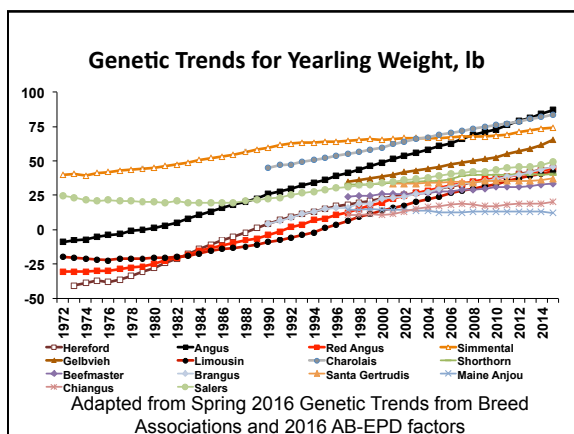
- $EPD_{i,YY}$ is the breed average EPD (current)
- $EPD_{i,USMARC}$ weighted average USMARC sire EPD where weight is the sum of numerator relationships between sires and progeny with phenotypes
- b is a scaling factor to convert USMARC solution to an industry scale

Across Breed EPD adjustment factors

- Calculated by scaling the 'current' breed difference (B_i) to Angus EPD base
 - Current breed difference is 2015 this year
 - Base difference calculated by subtracting the 2015 Angus average EPD from the 2015 breed average EPD

- For Breed i :

$$Factor_i = B_i - B_{Angus} - (EPD_i - EPD_{Angus})$$



Goal – multibreed

- Use breed differences from GPE to help parameterize International Genetic Solutions multibreed model
- We want to get to a point where the adjustment factor is the same (to Angus) for breeds in the IGS multibreed model
- Currently in prototype stage

Goal – multibreed

- Even after breed differences incorporated into IGS multibreed, not all breeds are active participants
 - Still a need for ABEPD or a similar system to adjust EPDs to a comparable scale
 - Many trait complexes do not fit a simple additive EPD adjustment
 - Need to continue to think about ways to deliver information in a timely manner if not in real time

BIF Working Group

- Committee was formed at midyear BIF board meeting to discuss multibreed evaluation and the ABEPD system and ways to facilitate multiple release dates of the factors (January 2017)

Darrh Bullock	Matt Spangler
Larry Kuehn	Mark Thallman
Wade Shafer	Lauren Hyde
Joe Epperly	Larry Keenan
Bob Weaber	

BIF Working Group

- Main conclusions
 - ABEPD adjustment factors still necessary for comparison of bulls across breed even for breeds involved in IGS multibreed
 - Write-up in eBeef.org February 2017 newsletter
 - Expedited release of factors prior to high-volume spring bulls buying season would be desirable
 - Particularly important when breeds change their base

Goals

- Short term
 - Starting this year, we will begin to target release of ABEPD factors early in the calendar year
 - USMARC will derive differences in late fall after weaning weights for spring calves have been recorded
 - We will need a feel for when breed associations can provide updates on GPE bulls and breed average EPDs from their NCE

Release of ABEPD

- Will also be releasing a new set of ABEPD adjustment factors later this summer
 - American Angus Association will be implementing changes to their NCE
 - Potential effect on all breeds in the ABEPD system
 - Have a few other breeds that have let me know that things have changed in their spring release since we obtained EPDs in Feb/Mar

Goals

- Long term
 - Would like a dedicated web-based system where breed associations can update their information (bulls, averages) and USMARC can adjust breed differences on their own schedule
 - Resulting factors would change in real-time based on data input from either source

Web-based implementation

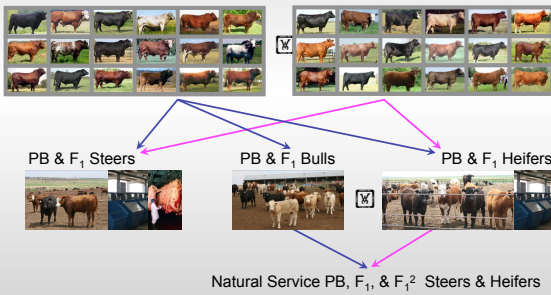
- Could also be used to accommodate several other goals we've been proposing for several years
 - Decision support systems
 - Non-additive EPD adjustment (calving ease, longevity/stayability, fertility)
 - We continue to seek funding to implement this type of system, but we will need industry support to fully realize this goal

GPE sampling/progress

- Have been transitioning from 'Cycle-based' system to continuous sampling of industry sires from 18 breeds for approximately 10 years
- Beginning to achieve goal of graded-up females from each breed with targeted crosses of several breed
- Targeting high accuracy (particularly sex and age limited traits) bulls based on current sire usage within breed

GPE Target Population Structure

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



Current progress to target

Breed	7/8+	3/4	Breed	7/8+	3/4
Angus	77	99	Beefmaster	14	35
Hereford	90	64	Maine Anjou	26	31
Simmental	74	82	Brahman	1	8
Charolais	73	60	Santa Gertrudis	26	13
Red Angus	54	32	Chiangus	16	22
Limousin	52	31	Salers	23	19
Gelbvieh	44	29	Braunvieh	16	16
Shorthorn	27	47	South Devon	8	14
Brangus	17	52	Tarentaise	5	15

These are approximately half of the GPE cows with the remainder being crosses

GPE sampling process

- We have sampled approximately 930 bulls since beginning continuous sampling in 2006
- More bulls from larger breeds, but proportional to registrations, breeds with fewer registered animals have a much higher percentage of bulls sampled

GPE sampling process

- Process can be fairly difficult to achieve and is time consuming
 - Generally target 180-200 bulls every two years
 - Traditionally have asked for enough straws to service 20-25 cows with some extra for DNA and connections
 - Target 10-12 progeny per bull
 - Becoming more difficult to find unique lines
 - Especially in breeds with fewer registrations

Changes

- We are considering asking for 40-50 straws per bull and sampling fewer bulls in the next round (this coming year)
- Would like any thoughts on perceived implications toward breed differences

Another possible change

- We are currently releasing (or have students working with) several trait complexes that would be considered novel
 - Generally not part of NCE for most breeds
- We are wondering about the impact of releasing 'multibreed' EPDs from these bulls to the industry

Current novel trait projects

- USMARC cattle
 - Feed intake/efficiency
 - Steer (concentrate) Transcriptomics
 - Heifer (roughage) Metabolomics
 - Cow (mature intake) Metagenomics
 - *E. coli* shedding
 - BRDC resistance
 - Fertility (direct/indirect)
 - Meat quality including tenderness
 - Cow efficiency
 - Cow longevity

Releasing EPD

- Who to release to?
 - Breed association? BIF?
- Can we release for bulls that we've already sampled?
 - Do breeders have a right to refuse release if they haven't been contacted?
 - Many of the bulls we've sampled in the past 10 years are fairly old now
- Would make this release part of future semen solicitation process

Increasing progeny per sire

- While this change is being considered primarily to decrease our sampling process, it would produce more progeny records for these novel trait complexes
- No way to guarantee sires will have equal progeny numbers or sex distribution will be equal as of now

Future of GPE

- We see this release of EPDs as a helpful byproduct, but not a primary service
 - Yearly updates would not occur
 - Would be summarized when breed differences are updated
- Please let us know your thoughts as we consider these changes

