


**ACROSS-BREED TABLES
for 2009
with year 2007 Angus base**



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Background

- Across-breed EPD adjustment factors have been computed for BIF since 1993
- Account for differences in EPD base in the genetic evaluations of each breed involved
- Uses USMARC Germplasm Evaluation (GPE) data to adjust for breed differences

Calculations

- 1) Solve for breed of sire solutions
USMARC GPE data
Sample of sires from participating breeds
Heterosis now fitted in the model
- 2) Get EPD of GPE sires and of 2007 born animals from breed associations
Used to scale differences from GPE data to breed EPD reported in 2007

Calculations

- 3) Adjust USMARC solutions to year 2007

$$USMARC(ADJ) = USMARC/b + [\overline{EPD}_{07} - \overline{EPD}_{USMARC}]$$

b is the fraction of EPD expressed in USMARC progeny phenotypes (expect b = 1.00)

Converts USMARC phenotypes to an industry scale

Regression (b) of Performance on EPD at USMARC (lb/lb)

| | Pooled over all breeds | |
|-------------------------|------------------------|----------|
| | Observed | Expected |
| Birth weight | 1.12 ± .04 | 1.00 |
| Weaning weight | .87 ± .05 | 1.00 |
| Yearling weight | 1.14 ± .05 | 1.00 |
| Maternal weaning weight | .55 ± .07 | .50 |
| Milk | 1.15 ± .10 | 1.00 |

Calculations

- 4) Compute adjustment factor (breed Y) relative to breed X (Angus) bull base:

$$[USMARC(Adj, Y) - USMARC(Adj, X)] - [\overline{EPD}_{07Y} - \overline{EPD}_{07X}]$$

All on an industry scale

Calculations

- 5) Use adjustment factor to compare bulls from different breeds:

bull i, breed Y: Table Factor + EPD(Y,i)

bull j, breed Z: Table Factor + EPD(Z,j)

Changes from 2008 analysis

- Change of model to estimate breed differences
 - Animal model with breed genetic groups
 - Accommodates changing structure of GPE program
 - AI-sired dams breed via AI in the future
 - Heterosis now fitted in the model
 - Weaning weight model includes maternal effects
- Addition of Chiangus and Santa Gertrudis
 - Both sampled starting in Fall 2006 for new GPE

Differences from 2008

- More phenotypic data added
 - Progeny of AI sires from 14 of top 16 breeds relative to registrations (new GPE)
 - 10-15 more sires sampled and 60-80 new progeny records for birth and weaning weights
 - Grandprogeny of AI sires (AN, HH, RA, CH, GV, LM SM, BN, BM)
 - Phenotypic data will continue to increase in 16 of the 18 breeds represented in the program
- Reflect changes in modeling breed differences (slight error found), in breed association EPD, added performance records from new GPE, and added grandprogeny records

Numbers of Sires, Progeny, Daughters, and Grandprogeny by Breed of Sire: Weaning Weight and Milk

| Breed | Number | | | | Breed | Number | | | |
|-------|--------|-------|-----|--------|-------|--------|------|-----|--------|
| | Sires | Prog | Dau | G Prog | | Sires | Prog | Dau | G Prog |
| AN | 114 | 1,383 | 559 | 2,650 | BV | 18 | 236 | 69 | 413 |
| HE | 120 | 1,830 | 730 | 3,424 | CH | 82 | 730 | 243 | 1,265 |
| RA | 33 | 388 | 98 | 508 | CA | 13 | 89 | 0 | 0 |
| SH | 41 | 257 | 69 | 264 | GV | 60 | 719 | 243 | 1,237 |
| SD | 15 | 134 | 70 | 373 | LM | 40 | 739 | 247 | 1,379 |
| BM | 22 | 215 | 51 | 220 | MA | 31 | 266 | 87 | 529 |
| BR | 54 | 640 | 246 | 1102 | SA | 43 | 257 | 88 | 361 |
| BN | 21 | 208 | 43 | 204 | SM | 52 | 705 | 245 | 1,370 |
| SG | 13 | 90 | 0 | 0 | TA | 7 | 191 | 80 | 367 |

Birth Weight Sire Breed Differences Adjusted to Birth Years of 2006 and 2007

| Breed | Update | | Breed | Update | |
|-------------|--------|------|-------------|--------|------|
| | 2008 | 2009 | | 2008 | 2009 |
| Angus | 0.0 | 0.0 | Braunvieh | 4.2 | 5.1 |
| Hereford | 4.1 | 4.2 | Charolais | 8.6 | 8.1 |
| Red Angus | 0.9 | 1.0 | Chiangus | | 3.1 |
| Shorthorn | 6.5 | 6.1 | Gelbvieh | 4.1 | 3.6 |
| South Devon | 3.5 | 4.9 | Limousin | 3.5 | 3.7 |
| Beefmaster | 7.4 | 6.0 | Maine-Anjou | 6.7 | 5.2 |
| Brahman | 11.9 | 10.8 | Salers | 3.1 | 2.1 |
| Brangus | 5.1 | 3.1 | Simmental | 4.7 | 4.6 |
| Santa Gert. | | 6.4 | Tarentaise | 2.3 | 1.8 |

Weaning Weight Sire Breed Differences Adjusted to Birth Years of 2006 and 2007

| Breed | Update | | Breed | Update | |
|-------------|--------|-------|-------------|--------|-------|
| | 2008 | 2009 | | 2008 | 2009 |
| Angus | 0.0 | 0.0 | Braunvieh | -7.0 | -21.2 |
| Hereford | -4.4 | -5.3 | Charolais | 19.2 | 18.0 |
| Red Angus | -16.1 | -17.7 | Chiangus | | -18.9 |
| Shorthorn | 3.8 | -9.3 | Gelbvieh | 3.5 | -0.8 |
| South Devon | 1.3 | 3.1 | Limousin | -5.6 | -4.3 |
| Beefmaster | 10.8 | 8.0 | Maine-Anjou | -5.1 | -14.1 |
| Brahman | 9.6 | 6.4 | Salers | 5.9 | -3.0 |
| Brangus | 9.1 | 0.3 | Simmental | 14.2 | 13.9 |
| Santa Gert. | | -22.4 | Tarentaise | -6.0 | -9.8 |

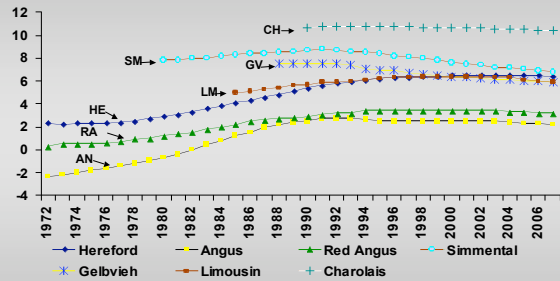
Yearling Weight Sire Breed Differences Adjusted to Birth Years of 2006 and 2007

| Breed | Update | | Breed | Update | |
|-------------|--------|-------|-------------|--------|-------|
| | 2008 | 2009 | | 2008 | 2009 |
| Angus | 0.0 | 0.0 | Braunvieh | -50.0 | -65.7 |
| Hereford | -22.3 | -28.1 | Charolais | 10.0 | 13.1 |
| Red Angus | -21.9 | -29.5 | Chiangus | | |
| Shorthorn | -8.2 | -3.8 | Gelbvieh | -24.9 | -18.6 |
| South Devon | -7.5 | -5.9 | Limousin | -30.1 | -29.5 |
| Beefmaster | -19.1 | -23.5 | Maine-Anjou | -28.9 | -23.7 |
| Brahman | -52.3 | -55.6 | Salers | -4.7 | 1.9 |
| Brangus | -8.7 | -19.9 | Simmental | -2.3 | -0.1 |
| Santa Gert. | | | Tarentaise | -47.3 | -51.1 |

Maternal Milk Sire Breed Differences Adjusted to Birth Years of 2006 and 2007

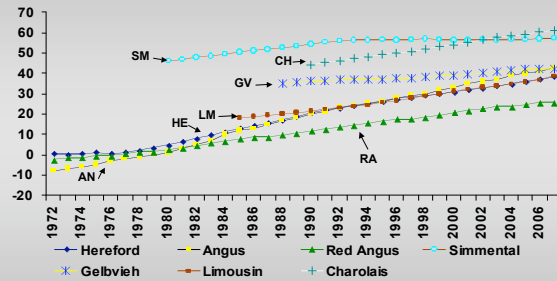
| Breed | Update | | Breed | Update | |
|-------------|--------|-------|-------------|--------|-------|
| | 2008 | 2009 | | 2008 | 2009 |
| Angus | 0.0 | 0.0 | Braunvieh | 5.3 | 10.4 |
| Hereford | -19.3 | -22.0 | Charolais | -10.2 | -8.4 |
| Red Angus | -7.8 | -7.4 | Chiangus | | |
| Shorthorn | 0.6 | 5.1 | Gelbvieh | 4.0 | 7.4 |
| South Devon | -4.4 | -5.6 | Limousin | -12.4 | -13.4 |
| Beefmaster | -20.3 | -15.9 | Maine-Anjou | -6.1 | -1.3 |
| Brahman | 13.4 | 14.3 | Salers | 1.4 | 1.0 |
| Brangus | -15.2 | -10.8 | Simmental | -1.1 | -2.6 |
| Santa Gert. | | | Tarentaise | 1.5 | 2.7 |

AB-EPD Genetic Trends for Birth Weight, lb



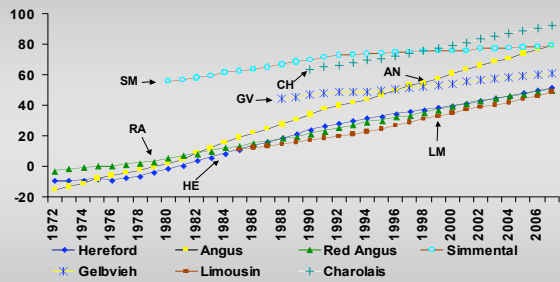
Adapted from Spring 2009 Genetic Trends from Breed Associations and 2009 AB-EPD factors

AB-EPD Genetic Trends for Weaning Weight, lb



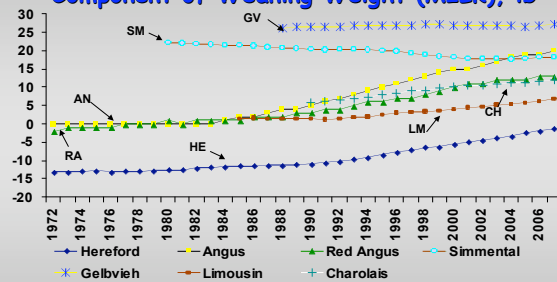
Adapted from Spring 2009 Genetic Trends from Breed Associations and 2009 AB-EPD factors

AB-EPD Genetic Trends for Yearling Weight, lb



Adapted from Spring 2009 Genetic Trends from Breed Associations and 2009 AB-EPD factors

AB-EPD Genetic Trends for Maternal Component of Weaning Weight (MILK), lb



Adapted from Spring 2008 Genetic Trends from Breed Associations and 2008 AB-EPD factors

BWT: Table Factors to Adjust EPD of Bulls of Different Breeds (2008 and 2008)

| Breed | Update | | Breed | Update | |
|-------------|--------|------|-------------|--------|------|
| | 2008 | 2009 | | 2008 | 2009 |
| Angus | 0.0 | 0.0 | Braunvieh | 6.2 | 7.5 |
| Hereford | 2.7 | 2.9 | Charolais | 9.6 | 9.7 |
| Red Angus | 2.8 | 2.9 | Chiangus | | 4.1 |
| Shorthorn | 6.5 | 6.1 | Gelbvieh | 4.4 | 4.5 |
| South Devon | 3.3 | 4.5 | Limousin | 4.0 | 4.2 |
| Beefmaster | 9.2 | 7.7 | Maine-Anjou | 7.0 | 5.5 |
| Brahman | 12.5 | 11.2 | Salers | 4.2 | 3.4 |
| Brangus | 5.8 | 4.7 | Simmental | 5.4 | 5.5 |
| Santa Gert. | | 8.1 | Tarentaise | 3.0 | 2.5 |

Example: BWT

| Breed | If Breed EPD | | Table | | Across-Breed EPD |
|-----------|--------------|---|-------|---|------------------|
| Angus | 2.6 | + | 0.0 | = | 2.6 |
| Simmental | 3.2 | + | 5.5 | = | 8.7 |
| Red Angus | 0.6 | + | 2.9 | = | 3.5 |

WWT: Table Factors to Adjust EPD of Bulls of Different Breeds (2008 and 2009)

| Breed | Update | | Breed | Update | |
|-------------|--------|------|-------------|--------|-------|
| | 2008 | 2009 | | 2008 | 2009 |
| Angus | 0.0 | 0.0 | Braunvieh | 29.4 | 21.4 |
| Hereford | -2.9 | -2.8 | Charolais | 39.0 | 38.2 |
| Red Angus | -5.2 | -5.4 | Chiangus | | -19.6 |
| Shorthorn | 31.0 | 19.9 | Gelbvieh | 5.0 | 1.7 |
| South Devon | 3.6 | 6.9 | Limousin | -3.8 | -3.4 |
| Beefmaster | 45.1 | 44.2 | Maine-Anjou | -3.6 | -10.7 |
| Brahman | 38.0 | 36.3 | Salers | 30.3 | 22.7 |
| Brangus | 27.4 | 21.9 | Simmental | 23.3 | 25.0 |
| Santa Gert. | | 17.1 | Tarentaise | 31.5 | 29.7 |

YWT: Table Factors to Adjust EPD of Bulls of Different Breeds (2008 and 2009)

| Breed | Update | | Breed | Update | |
|-------------|--------|-------|-------------|--------|-------|
| | 2008 | 2009 | | 2008 | 2009 |
| Angus | 0.0 | 0.0 | Braunvieh | 17.8 | 12.8 |
| Hereford | -12.8 | -16.1 | Charolais | 47.3 | 51.9 |
| Red Angus | 0.9 | -4.4 | Chiangus | | |
| Shorthorn | 44.1 | 52.8 | Gelbvieh | -22.4 | -12.6 |
| South Devon | -5.7 | -1.4 | Limousin | -27.8 | -28.6 |
| Beefmaster | 45.1 | 44.0 | Maine-Anjou | -31.6 | -22.8 |
| Brahman | 2.5 | 2.2 | Salers | 43.4 | 52.3 |
| Brangus | 28.8 | 19.9 | Simmental | 16.9 | 22.4 |
| Santa Gert. | | | Tarentaise | 18.2 | 17.9 |

MILK: Table Factors to Adjust EPD of Bulls of Different Breeds (2008 and 2009)

| Breed | Update | | Breed | Update | |
|-------------|--------|-------|-------------|--------|-------|
| | 2008 | 2009 | | 2008 | 2009 |
| Angus | 0.0 | 0.0 | Braunvieh | 25.3 | 30.6 |
| Hereford | -15.3 | -17.5 | Charolais | 2.9 | 5.6 |
| Red Angus | -3.9 | -3.0 | Chiangus | | |
| Shorthorn | 18.1 | 23.1 | Gelbvieh | 7.0 | 9.9 |
| South Devon | -5.6 | -6.5 | Limousin | -11.9 | -14.2 |
| Beefmaster | -2.1 | 2.6 | Maine-Anjou | -6.0 | -0.8 |
| Brahman | 27.5 | 29.0 | Salers | 13.1 | 13.1 |
| Brangus | -3.9 | 2.4 | Simmental | 13.9 | 13.7 |
| Santa Gert. | | | Tarentaise | 20.5 | 22.2 |

Breed of Sire Means and Deviations from Angus on Industry Scale (Spring, 2008 Genetic Evaluations; lb)

| Breed | BWT* | WWT* | YWT* | MILK* |
|-------------|-----------|-------------|-------------|-------------|
| Angus | 85 (0.0) | 526 (0.0) | 908 (0.0) | 517 (0.0) |
| Hereford | 89 (4.2) | 520 (-5.3) | 880 (-28.1) | 495 (-22.0) |
| Red Angus | 86 (1.0) | 508 (-17.7) | 878 (-29.5) | 509 (-7.4) |
| Shorthorn | 91 (6.1) | 516 (-9.3) | 904 (-3.8) | 522 (5.1) |
| S. Devon | 90 (4.9) | 529 (3.1) | 902 (-5.9) | 511 (-5.6) |
| Beefmaster | 91 (6.0) | 534 (8.0) | 884 (-23.5) | 501 (-15.9) |
| Brahman | 96 (10.8) | 532 (6.4) | 852 (-55.6) | 531 (14.3) |
| Brangus | 88 (3.1) | 526 (0.3) | 888 (-19.9) | 506 (-10.8) |
| Santa Gert. | 91 (6.4) | 503 (-22.4) | | |
| Braunvieh | 90 (5.1) | 504 (-21.2) | 842 (-65.7) | 527 (10.4) |
| Charolais | 93 (8.1) | 544 (18.0) | 921 (13.1) | 508 (-8.4) |
| Chiangus | 88 (3.1) | 507 (-18.9) | | |
| Gelbvieh | 88 (3.6) | 525 (-0.8) | 889 (-18.6) | 524 (7.4) |
| Limousin | 88 (3.7) | 521 (-4.3) | 878 (-29.5) | 503 (-13.4) |
| Maine Anjou | 90 (5.2) | 512 (-14.1) | 884 (-23.7) | 515 (-1.3) |
| Salers | 87 (2.1) | 523 (-3.0) | 910 (1.9) | 518 (1.0) |
| Simmental | 89 (4.6) | 540 (13.9) | 908 (-0.1) | 514 (-2.6) |
| Tarentaise | 87 (1.8) | 516 (-9.8) | 857 (-51.1) | 519 (2.7) |

*Adjusted to USMARC EPD and weight means for Angus

Carcass Trait Across-Breed Factors

- Same idea as factors for weight traits
 - See if EPD predict differences we see at USMARC (regression of performance on EPD)
 - If so, adjust breed bases using the USMARC predicted breed differences
- Regression have been quite different from 1.00
 - Regressions predicted accurately?

2009 EPD Regressions To Predict USMARC Steer Performance

| Overall | N | Reg'n ± SE | Acc |
|---------------|-------|-------------|----------------|
| Marbling | 2,144 | 0.67 ± 0.08 | 0.53 |
| Ribeye area | 2,146 | 1.28 ± 0.12 | 0.53 |
| Fat thickness | 1,889 | 1.39 ± 0.15 | 0.52 |
| | | | (0.17 to 0.81) |

• Expectation of regression is 1.00

• 34 to 581 progeny per breed

Carcass Trait Across-Breed Factors

- Regressions still more different than 1.00 relative to weight traits
- Within breed regressions much more variable
- For now, carcass trait regression coefficients fixed at 1.00
 - May 'settle' as more data added from new GPE

This year

- To participate, breeds must calculate EPD with age-adjusted endpoint and report EPD on a carcass basis
- This year, 11 breeds were able to supply EPDs in this form
- EXPECT CHANGES in years to come

Carcass Trait Breed Differences Adjusted to a Birth Year of 2007

| Breed | Marbling | Ribeye Area | Fat Thickness |
|-------------|----------|-------------|---------------|
| Angus | 0.00 | 0.00 | 0.000 |
| Hereford | -0.64 | -0.22 | -0.066 |
| Red Angus | -0.26 | -0.31 | -0.057 |
| Shorthorn | -0.25 | -0.05 | -0.144 |
| South Devon | -0.37 | 0.34 | -0.132 |
| Braunvieh | -0.56 | 0.64 | -0.163 |
| Charolais | -0.78 | 0.65 | -0.254 |
| Maine-Anjou | -1.11 | 1.18 | -0.208 |
| Limousin | -1.02 | 1.08 | |
| Salers | -0.42 | 0.65 | -0.235 |
| Simmental | -0.78 | 0.85 | -0.194 |

Table Factors to Adjust Carcass EPD of Bulls of Different Breeds to an Angus Base

| Breed | Marbling | Ribeye Area | Fat Thickness |
|-------------|----------|-------------|---------------|
| Angus | 0.00 | 0.00 | 0.000 |
| Hereford | -0.36 | -0.24 | -0.057 |
| Red Angus | -0.01 | -0.21 | -0.045 |
| Shorthorn | 0.06 | 0.12 | -0.133 |
| South Devon | -0.32 | 0.39 | -0.131 |
| Braunvieh | -0.26 | 0.78 | -0.149 |
| Charolais | -0.50 | 0.63 | -0.244 |
| Maine-Anjou | -0.80 | 0.93 | -0.197 |
| Limousin | -0.92 | 1.07 | |
| Salers | -0.11 | 0.78 | -0.224 |
| Simmental | -0.60 | 0.92 | -0.193 |

Summary

- Reevaluate regression for carcass traits in future years
- Carcass differences between breeds for are in the expected direction and relative magnitude

Summary

- Carcass data are still limited (relative to growth) and factors and breed comparisons are likely to change as the system is implemented
- More data being added to the system for next year
 - Should continue with new breeds for growth and carcass traits under new GPE
 - Especially true for breeds that hadn't been sampled for 20+ years

Questions?