Things That Annoy Me About National Cattle Evaluation

R. Mark Thallman
U.S. Meat Animal Research Center

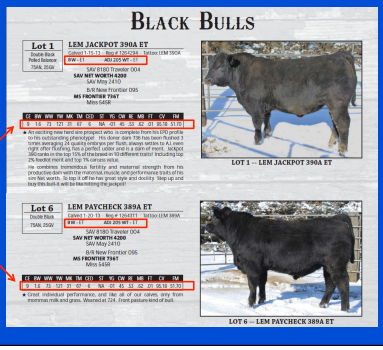
Disclaimer

- This presentation is as much a self-incrimination of my own failings as an indictment of any other person or organization.
- It is offered in the spirit of constructive criticism.

Motivation for this Presentation

- I went to a bull sale to help my father-in-law buy a bull

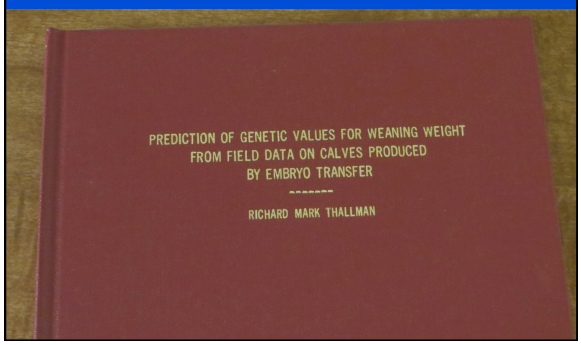
And What I Found Was …



Identical Mid-parent EPDs

How can we expect people to look only at the EPDs and ignore actual birth weights if the best EPD we can provide is a pedigree average?

This was the Topic of my Master's Thesis in 1988.



Different Accuracy by Type of Recipient (BWT)

Table 3. Effect of maternal environments with different maternal variances on phenotypic variance and additive direct heritability and total heritability.

Variance or Heritability	ET-R & NET[1]	HO Recip.	UNK Recip.	XB Recip.
Maternal var., kg^2	4.1±0.4	13.4±1.2	8.2±0.5	8.3±1.8
Phenotypic var., kg^2[†]	26.9±0.6	39.2±1.3	34.3±0.8	34.4±1.9
Add. heritability, %[‡]	41.4±4.3	28.4±3.1	32.5±3.4	32.4±3.8
Total heritability, %[§]	47.5±3.3	32.6±2.4	37.3±2.5	37.1±3.1

[1]Non-ET calves were equivalent here to registered recipient, except genetic dam and recipient were the same cow.

Some Breeds Use Records on ET Calves with Registered Recips

Table 3. Effect of maternal environments with different maternal variances on phenotypic variance and additive direct heritability and total heritability.

Heritability for registered recipients was not different from non-ET calves

Variance or Heritability	ET-R & NET[1]	HO Recip.	UNK Recip.	XB Recip.
Maternal var., kg^2	4.1±0.4	13.4±1.2	8.2±0.5	8.3±1.8
Phenotypic var., kg^2[†]	26.9±0.6	39.2±1.3	34.3±0.8	34.4±1.9
Add. heritability, %[‡]	41.4±4.3	28.4±3.1	32.5±3.4	32.4±3.8
Total heritability, %[§]	47.5±3.3	32.6±2.4	37.3±2.5	37.1±3.1

[1]Non-ET calves were equivalent here to registered recipient, except genetic dam and recipient were the same cow.

Why Do the Largest Cow-calf Producers Calculate Within-herd EPDs?

- I believe that several of the largest cow-calf operations have seedstock divisions and have within-herd EPDs calculated for them.
- I speculate this is because they do not believe their needs are being met by the purebred cattle industry.

Fertility EPDs

- Stayability was a great first attempt and it has had the desirable effect of transitioning the seedstock industry to whole-herd reporting.
- But, if it has ever been viewed as the ultimate goal, we have aimed too low.
- And culling open cows is not the answer.

Model for 1st Class Fertility EPDs

- Fit Days to Calving and Preg/Open as separate traits.
- Fit 1st, 2nd, and later parities each as a separate pair of traits.
  - 6-trait model
- Data requirements are not absent, but they are feasible (in my opinion).
  - And, there is no out-of-pocket measurement cost!

No Attempt to Account for Genotype × Environment Interaction

No Attempt to Evaluate Components of Longevity

- We could collect disposal codes and run survival analysis.
- Visual scores:
  - Structural soundness
  - Udder soundness
  - Sheath scores

Avoidance of Subjective Information

- We do have EPDs for calving ease and docility
- We have standards for udder scoring, but not EPDs
- No EPDs for structural soundness, sheath score, etc.

Why Don't We Reward Breeders for Submitting High Quality Information?

- Breeders who submit high quality information could have higher accuracies.
- Those who do not or where there is evidence of bias could have lower accuracies and their animals EPDs could correspondingly be shrunken more toward the mid-parent mean.
- This could be done statistically as part of the evaluation.

Why Don't We Take Advantage of Orders of Magnitude of Improvements in Computing Power

- I seriously doubt that any National Cattle Evaluation currently run could not be calculated on a smartphone, if the software to do it was written.
- We could run far more sophisticated models on high-end computing hardware and I believe we could improve accuracy and utility.

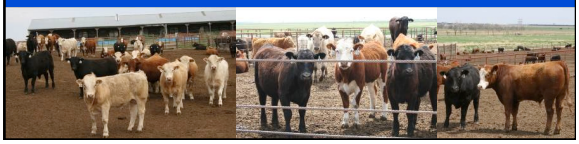
Why Do We Assume that NCE has to run in Software Written Specifically for this Task?

- I believe there is software that is capable of applying far more sophisticated models to the volume of data that we have.
- We no longer qualify as "Big Data".

Why are we so Reluctant to Improve NCE?

- Reranking bulls does not imply progress, but it is an inevitable consequence of progress.

Why is Post-weaning Gain Treated as the same trait in Bulls, Heifers, and Steers?



Reluctance to Fit Improved Models

- X-chromosome
- Gametic imprinting

Why are we so Reluctant to Re-estimate Genetic Parameters?

Lack of Progress on Decision Support

Questions?

Mention of a trade name, proprietary product, or specific equipment does not constitute a guarantee or warranty by the USDA and does not imply approval to the exclusion of other products that may be suitable. USDA is an equal opportunity provider and employer.