Update on Multibreed Evaluation (MBE) Growth Prototype Research

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Why Consider Multi-Breed Evaluation (MBE)?

Application of MBE to individual breed assoc. data set.

- Potential increase in accuracy of genetic values due to inclusion of additional information.
- Genetic values can be computed on animals of any breed composition contained in the data set.

Application of MBE to pooled breed assoc. data sets

- Genetic values provided can be used directly in decision support tool to provide individualized herd comparisons of sires, across breed, to enhance profit.

Effects in MBE Model

Multi-Breed Model : WWT = Fixed Effects +
Direct Heterosis + Maternal Heterosis +
Direct Breed Effect + Maternal Breed Effect +
Direct Genetic Effect + Maternal Genetic Effect +
Maternal Permanent Environmental Effect + ε

Genetic value provided by MBE for an animal =
Est. Breed Effects + Est. Genetic Effects

Features of MBE

- Prior literature values are relied upon to account for breed differences in "founder animals" and to account for heterosis effects.
- Founder animals may not be representative of their breed(s).
- Changes in genetic values (genetic trends) can occur through selection within the population and through the introduction of new animals into the population at different points in time—these two types of trends are accounted for in the MBE.
- MBE can predict genetic differences (EPDs) for animals contained in the data set.
- Current "true" breed differences in a MBE data set may not be reflected in breed average EPD differences.

NBCEC Multibreed Growth Evaluation Prototype Research Project

- In 2004, Several breed associations wanted NBCEC to investigate the feasibility of a MBE for growth that combines several breeds together.
- Cornell would provide the information management program and data management expertise; UGA would provide the multibreed evaluation programs and expertise to compute final MBE EPDs and accuracies.
- 17 breeds agreed to participate in the research project.

NBCEC Multibreed Growth Evaluation Prototype Research Project

- Cornell began in 2004 to combine the data from the breed associations; initially each breed was added one at a time and then an evaluation was conducted. Results were to be sent back after each evaluation.
- In April, 2006 UGA received a data set containing 11 breeds to run through its MBE programs. To date, the NBCEC has conducted six MBE prototype analyses. The last MBE prototype evaluation was conducted in March, 2007 and contained all 17 breeds and 17 million records.

Rank Correlations and Genetic Trends of Limousin EPDs Predicted from MBE Prototype and Within-Association MBE

EPD	Rank Corr.	Genetic Trends (lbs/yr) MBE	Within-Assoc.
BWT	0.97	0.11	0.10
WWT	0.95	0.88	0.84
Milk	0.88	0.09	0.15
YWT	0.96	1.54	1.49

Rank Correlations and Genetic Trends of Gelbvieh EPDs Predicted from MBE Prototype and Within-Association MBE

EPD	Rank Corr.	Genetic Trends (lbs/yr) MBE	Within-Assoc.
BWT	0.97	-0.05	-0.05
WWT	0.87	0.08	0.39
Milk	0.59	-0.27	0.11
YWT	0.88	0.40	0.83

Research to Determine Reasons for Discrepancies in AGA EPDs Between MBE Prototype and Within Association Analyses.

- Determined that differences in contemporary grouping were not the cause.
- Determined that differences in pedigree structure were not the cause.
- Determined that data from certain breeds were not the cause.
- Now comparing AGA information contained in the prototype data set to the AGA information contained in the within-association evaluation.

NBCEC MBE Growth Prototype Research Project

- Goal of the research is to keep running the prototype until discrepancies are resolved and until repeatability of results can be "guaranteed".
- The next MBE growth research prototype will be conducted in July-August, 2007.
- Research is also being conducted on random regression growth MBE, MBE calving ease evaluation, and MBE carcass evaluation.

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